

Plates of Eurydaima javanica +

Podargus javanensis are

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ZOOLOGICAL RESEARCHES

IN JAVA,

AND THE NEIGHBOURING ISLANDS.

BY

THOMAS HORSFIELD, M. D. F. L. S. M. G. S.

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HONORABLE THE LORD OF THE MANOR

AND THE LORDS OF THE MANOR

HONORABLE THE LORD OF THE MANOR

THIS WORK

WITH A HISTORY OF THE MANOR

OF THE MANOR

OF THE MANOR

THE AUTHOR

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TO THE

HONOURABLE THE COURT OF DIRECTORS

OF THE

Honourable East India Company,

THIS WORK

IS, WITH THEIR PERMISSION, RESPECTFULLY DEDICATED,

BY THEIR GRATEFUL AND

OBEDIENT SERVANT,

THE AUTHOR.

P R E F A C E.

IN the prosecution of this Work, the plan originally offered to the Public has been adhered to with every possible degree of solicitude. The design of the undertaking was to exhibit accurate Figures, accompanied by detailed descriptions, of the most interesting Quadrupeds and Birds collected during my residence in Java. It was also stated, in the commencement, that, by the liberal permission of the Honourable Court of Directors of the East India Company, I had been enabled to avail myself of the valuable Collections forwarded by Sir Thomas Stamford Raffles from Sumatra. The arrangement which has been made of these Collections under the orders of the Court, in the Company's Museum at the India House, has greatly facilitated the means of introducing into this Work various subjects which had not previously been given to the Public.

Throughout the continuance of these Zoological Researches, I have uninterruptedly enjoyed the support of the Artists originally engaged for the illustrations. To William Daniell, Esq. I am indebted for the drawings of the Quadrupeds, and Mr. William Taylor has, with great assiduity, afforded the aid of his skill in the Engravings. The greatest proportion of the Birds has been drawn on stone by Mr. Auguste Pelletier, who has likewise been charged with the superintendence of their colouring. In several of the Birds Mr. John Curtis has afforded his assistance, both in the drawing and engraving: the illustration of the new genera requiring a minuteness of detail, which could not with equal effect be given on stone. Every exertion has been made to preserve the same style of execution in which the

PREFACE.

Work commenced. In order to afford sufficient time for the execution of the Plates, a small extension of the period in which the successive Numbers were engaged to be delivered, has been required : this, I trust, will not be a subject of disapprobation.

I request the supporters of this Work to accept my cordial acknowledgements : I am happy to enumerate among these, many Gentlemen who have, since my arrival in England, honoured me with their friendship.

To the distinguished patronage of the HONOURABLE COURT OF DIRECTORS OF THE EAST INDIA COMPANY, the origin and progress of this Work is in a great measure indebted. At the conclusion, I entreat the permission of the HONOURABLE COURT to tender to them the tribute of my sincerest gratitude and obligation. The Work was originally dedicated to this Honourable Body, and with all its imperfections, it affords an additional evidence of the patronage afforded to science in their oriental possessions.

As the Public has been prepared to expect a more general report of my Researches, in consequence of the favourable reference to them by the distinguished and enterprising Author of the History of Java, in the Preface to that Work, I embrace this opportunity to state, that although some delay has occurred in the publication, the materials collected have not remained unexamined or undescribed. I am happy to announce, that my friends, William S. Macleay, Esq. and Robert Brown, Esq., have, with great disinterestedness, undertaken to give to the Public that part of my Entomological and Botanical Collections which may be most interesting, and a more particular notice of the Works proposed will appear without delay.



— — — — —
One Foot

SIMIA SYNDACTYLA.

Drawn by W. Daniell.

Engraved by W. Taylor.

SIMIA SYNDACTYLA.



ORD. II^{de} QUADRUMANES, *Cuvier*. 1^{re} Famille, les Singes.

ORD. I. PRIMATES, *Linn. Syst.*

ORD. II. POLLICATA, *Illiger*. Fam. 1, Quadrumana.

SIMIA, *Linn. Briss. Schreb. Cuvier*.

HYLOBATES, *Illiger*.

PITHECUS, *Geoffroy-Saint-Hilaire*.



Simia aterrima, collo pectoreque nudis, indice et digito medio podariorum coadunatis.
Siamang, of the Malays.

Simia syndactyla, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra, Tr. Linn. Soc. XIII. p. 241, 1821.*



TO the following description of the *Simia syndactyla* it may be proper to premise, that the generic name is employed, by SIR STAMFORD RAFFLES, according to the classification of Linnæus. M. Cuvier, in preserving in the order of *Quadrumanes* the two Genera of *Simia* and *Lemur*, has found it necessary to divide each into several Sub-genera; and the celebrated Illiger, in his *Prodromus Systematis Mammalium et Avium*, has established among those *Quadrumana*, which, according to his views, agree in generic characters with the *Simia Lar*, a distinct genus, denominated HYLOBATES: this is arranged immediately after the genus *Simia*, and is distinguished principally by the proportionally greater length of the anterior extremities, which, when the animal stands erect, reach to the ground, by the naked callosities on the buttocks, by a comparatively short muzzle, and a facial angle of sixty degrees. Agreeably to the *Tableau des Quadrumanes* of M. Geoffroy-Saint-Hilaire, contained in the XIXth Volume of the *Annales du Museum*, the *Simia syndactyla* belongs to the genus PITHECUS.

The *Simia syndactyla*, as well as the *Tupaia tana*, which is described in the preceding article, form part of the Zoological Collection which was forwarded to the Honourable East India Company, by SIR STAMFORD RAFFLES, from Sumatra;

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the arrangement of which is now in progress at their Museum at the India House, together with that of a general series of Quadrupeds and Birds from Java and other Islands of the Eastern Archipelago. Three specimens of the Siamang, of different sexes and ages, are placed in that Museum; and, with the permission of the Honourable Court of Directors, I am enabled to illustrate the description of SIR STAMFORD RAFFLES, contained in the thirteenth volume of the Transactions of the Linnean Society, by a figure of our animal from the pencil of Mr. Daniell, and to add some details regarding its dimensions, form, and bony fabric.

“The *Simia syndactyla* is of a jet-black colour throughout; it is upwards of three feet in height, and of a robust and muscular frame. It agrees with the *Simia Lar* of Linnæus, in being tailless, having naked callosities, and arms reaching to the feet. It differs, however, essentially in having the index and middle toes, or rather fingers, of the hind feet united as far as the middle of the second phalanx; in having two loose and naked folds of skin on the throat, which I have observed to be occasionally inflated with air; and in being entirely black, with the exception of a few brown hairs on the chin, which appear to become gray with age. The hair is long and soft; the face is without hair, and black, as are also the breasts of the female. The orbits of the eye are circular, and remarkably prominent. The canine teeth are long.”—Tr. Linn. Soc.

The DIMENSIONS of the largest specimen, at the Museum at the India House, are the following:—

	Feet.	Inches.
Entire height from the heel to the summit of the head.....	3	2
Length of the head and neck	0	6
..... the arm.....	1	0 $\frac{1}{2}$
..... the fore arm	1	2 $\frac{1}{2}$
..... the hand and fingers	0	5 $\frac{1}{2}$
..... the thigh bone	0	8 $\frac{1}{2}$
..... the leg	0	8
..... the foot.....	0	5 $\frac{1}{2}$

The skull of an adult subject, which I examined at the Museum of the Royal College of Surgeons, affords the following remarks:—Its dimensions longitudinally, from the most projecting point of the front teeth to the occiput, are five inches and two lines, and its height three inches and six lines. The general form is oblong, increasing very slightly in breadth posteriorly. The orbits advance greatly in front, by means of the frontal-margin projecting forward, being continued

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around the orbit, and forming a short tube surrounding the eye. The temporal-ridges on each side are very prominent, and run parallel to each other from the frontal-margin to the occiput, separated about one inch. The posterior part of the skull is terminated abruptly by a plain surface, which is bounded by a prominent ridge. The teeth exhibit the following particulars:—In the upper jaw, the intermediate front teeth are short, broad, and subconvergent; the next on each side is distant and narrower. The canine teeth stand separated from the other teeth, are very large at the base, and although in the specimen the points are broken off, they have the appearance of having projected far beyond the other teeth. There are two bicuspidati and three quadricuspidati on each side, having the general form of these teeth as well in the *Simia Satyrus* of Linnæus, as in man; their surfaces are much worn by trituration. In the lower jaw the front teeth are disposed uniformly, with a small space between each; here the two intermediate teeth are smallest, and they are generally narrower than the front teeth in the upper jaw, and much worn by trituration. The canine teeth greatly exceed the front teeth in length; they tend obliquely outward, and have an additional projection or gradus at the base. The first grinder in the Siamang, as well as in several other *Quadrumanæ* from the Eastern Islands, has a character essentially different from the first bicuspidatus in man. It presents one high, acute, conical or pyramidal point, projecting considerably beyond the second bicuspidatus, with an oblique edge, corresponding to the canine tooth in the upper jaw, with a less prominent tubercle near the base. The second bicuspidatus has the same form as the corresponding tooth in the upper jaw; to this follow, on each side, three quadricuspidati, resembling those in the upper jaw, and equally worn on the surface by trituration.

A comparison of the skeleton of a young subject of *Simia syndactyla*, lately obtained from Sumatra, and of an adult skeleton of *Simia Lar*, having been afforded to me by Joshua Brookes, Esq. at his Museum in Blenheim Street, with distinguished liberality, I am enabled to add the following remarks in further illustration of the bony fabric of our animal.—The head in the *Simia syndactyla* is more rounded posteriorly; it has an obovate form, and the orbital-margins and temporal ridges less developed. The canine teeth extend but slightly beyond the front teeth. Of three grinders, which are as yet apparent, the two posterior are quadricuspidati, with considerably projecting points; and the secondary front teeth present a serrated margin, as they do in man on their first appearance. The bones of the anterior extremities are proportionally longer than in *Simia Lar*, and extend beyond the malleolus quite to the ground; the bones of the thumb are also more lengthened and slender. The skull of the adult *Simia Lar* agrees strikingly with that of the adult *Simia syndactyla*: it has the same oblong form; the orbital-margins, and the annular-

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ridges surrounding the orbits, are equally prominent, and the temporal-ridges extend to the occiput, at regular distances from each other, in a parallel manner. The canine teeth are considerably elongated.

The following remarks have presented themselves on a review of the specimens deposited at the Museum in the India House. The most striking character is the excessive length of the anterior extremities;—this is already shewn by the dimensions given above. The head is oblong and rounded posteriorly. The neck is very short. The face is nearly naked; a few very short decumbent hairs are scattered sparingly on the nose and cheeks. On the upper lip and chin the beard is distributed, consisting of grayish hairs, having an uniform oblique direction.

The muzzle is short, and the facial angle between 60 and 65 degrees. The nose is flat and depressed above, but rises below abruptly, with a cartilaginous eminence, in which the nearly circular nostrils are pierced from the sides in an oblique direction. At its extremity this eminence is obtuse, and united to the upper lip by a narrow gradually attenuated apex, which forming a cartilaginous arch, gives a peculiar character to the Siamang.

The orbital-margin is very prominent, and the frontal-bone rises above the eyes obliquely, with a very gradual inclination backward. This part is covered with hairs, which have a different character from those on other parts of the body; they are regular and straight, and being closely applied to the surface of the head, form a gradually rising plain, on which the hair appears as if dressed or rendered smooth by art. The ears are closely applied to the head, margined, and have externally the same structure as in man: they are in great measure concealed by the hairy covering of the lateral parts of the head. The trunk is rather slender, and the abdomen is not distended as in the Orang-utan. The buttocks have small callosities. The fingers of the hands of the anterior extremities are very slender, and of uncommon length; the thumb is of smaller dimensions than the fingers, and it is removed so far back, that it scarcely extends beyond the metacarpal bones; it appears, however, to be calculated to be employed as an antagonist to the fingers. The nails of the thumb and fingers are uniform, slightly rounded and elevated in the middle. On the hands of the posterior extremities the fingers are proportionally small and slender. The index and the middle finger are closely united to the middle of the second phalanx. The thumb is long, robust, and placed nearer to the fingers than in the anterior extremities; the nail is even, while the nails of the fingers resemble those of the anterior extremities. The throat and neck in young animals are completely naked; in the adult subjects the nakedness extends to the breast, and is only

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partially interrupted by a narrow band of hairs extending across the lower part of the neck. The folds of naked skin mentioned above in the description of the living animal, appear distinctly in the prepared specimens.

The hairy covering of the head and extremities affords a very peculiar character to the *Simia syndactyla*, and its thickness increases considerably the bulk of these parts. It consists of hairs close and woolly near the skin, united in small tufts, which diverge irregularly, and form a shaggy fleece, which invests the surface of our animal. The separate hairs are above two inches long, and on every part, except the head, they are slightly curved, so as to cause a somewhat frizzled appearance. The colour of these hairs is most intensely black.

SIR STAMFORD RAFFLES adds to the description above given, that the Siamangs are abundant in the forests near Bencoolen, where they are seen in large companies, making the woods echo with their loud and peculiar cry. Besides the specimens contained in the collection forwarded to England, he has recently procured a living Siamang, which is very tame and tractable; in fact, he is never happy but when allowed to be in company with some one.



SEMNOPITHECUS MAURUS.

SEMNOPITHECUS MAURUS.



ORD. II^{de} QUADRUMANES, *Cuvier*. 1^{re} Famille, les Singes.

ORD. I. PRIMATES, *Linn. Syst.*

ORD. II. POLLICATA, *Illiger*. Fam. 2, Quadrumana.

SEMNOPITHECUS, *Fréd. Cuv. Mamm. lithogr.* 30. *livrais*.

SIMIA, *Linn. Cuv. Schreb.*

CERCOPITHECUS, *Briss. Erxleb. Cuv. Illig. Geoff.*

CHARACTER ESSENTIALIS.—*Laniarii* superiores obsolete triangulares, interne longitudinaliter sulcati. *Molares* inferiores postremi quinquecuspidati. *Pedes* elongati.

CHARACTER NATURALIS.—*Dentes* continui, *primores* utrinque quatuor, supra intermedi latiores, externi rotundati, infra externi basi gradu parvo laterali aucti; *Laniarii* supra primoribus multo longiores, obsolete triangulares, subintorti, latere interno longitudinaliter sulcati, infra minus elongati verticales, subarcuati; *Molares* supra quinque, anteriores duo bicuspidati, acie interna minore brevior, posteriores tres quadricuspidati aciebus prominulis subæqualibus; infra quinque, primus secundo magis porrectus unicuspidatus acie obliqua sectoria, compressus, radicibus duabus inæqualibus mandibulæ oblique inunctus, pyramidalis quadrilaterus, lateribus inæqualibus, latere anteriore extus spectante maximo, oblique decurrente, attritu dentis laniarii superioris lævigato, basi incrassatus, de serie aliorum dentium oblique protrusus, secundus bicuspidatus postice gradu brevi transversa auctus, tertius et quartus quadricuspidati, postremus quinquecuspidatus.

Rostrum mediocriter productum; facies parte superiore plana, maxilla sub elongata; angulus facialis 45 graduum. *Vultus* denudatus. *Nasus* basi depressus, attenuatus; *nares* laterales oblongæ seminulares horizontales. *Auriculæ* marginatæ.

Corpus gracile. *Cauda* elongata laxa. *Mammæ* duo pectorales cylindraceæ.

Pedes omnes manibus pentadactylis, graciles, elongati; scelides antipedibus paulo longiores: pollice manicularum minuto a digitis remoto. *Ungues* pollicum lamnares digitorum subtegulares. *Nates* tyliis instructæ.

AFFINITAS.—Hoc genus inter Cercopithecus, nuper a Cel. Fréd. Cuviero rite definitos, et Hylobates Cel. Illigeri, disponendum est.

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Semnopithecus aterrimus, pectore abdomine artubus intrinsicis caudæque basi
subtus canis.

Budeng, or *Lutung*, of the Javanese.

Lotong, of the Malays.—*Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra*,
Tr. Linn. Soc. XIII. p. 247, 1821.

Simia maura, *Schreb. Säugth.* I. p. 107, t. XXII. B.

Simia maura, *Gmel. Syst.* p. 35.

Simia maura, Div. γ. *Cercopithecini*: *Bodd. Elen. anim.* I. p. 60.

Cercopithecus maura, *Erxleb. Syst. Regn. anim.* p. 41.

Cercopithecus maurus, *Geoffr. St. Hil. Tableau des Quadrumanes. Ann. du Mus.*
T. XIX. p. 93.

Cercopithecus maurus, *Encycl. Method. Mammalog.* p. 55. *Par. M. A. G. Des-*
marest, 1820.

Le Maure, *G. Cuv. Le Règne animal, &c.* p. 105.

Middle sized black monkey, *Edwards's Glean.* p. 221, t. 311.

Guenon nègre, *Buff. Supp. tome 7*, p. 83.

Negro monkey, *Pennant Quadr.* 3. *Ed.* p. 206, and *Shaw's Gen. Zool. Vol. I.*
part 1, p. 47.

THE animal which I propose to consider in the present article, has long been known by the name of *Simia Maura*, and it has been received into all the systematic Catalogues. My principal object at present is to give an accurate figure, both of the adult and of the young subject, illustrated by its history, as I observed it in Java.

M. Cuvier enumerates the “Maure” among the Guenons, which comprise in the *Règne animal* a considerable number of the *Cercopithecini* of *Erxleben*; and M. M. Geoffroy and Desmarest have likewise arranged our animal in the genus *Cercopithecus*, as employed by them individually. The generic name placed at the head of this article, was first proposed by M. Fréd. Cuvier in the 30th *Livraison* of the “*Histoire naturelle des Mammifères, &c.*” in the description of the *Cimepaye*. Various animals of this order, forwarded from Sumatra by M. Duvaucel, enabled M. Cuvier to distinguish satisfactorily the “Maure,” and several other *Quadrumana*, which will be mentioned in the sequel, from the *Cercopithecini*, or Guenons; and in a late work by the same Author, entitled “*Des dents des Mammifères, considérées comme caractères zoologiques*,” this genus is more accurately defined and illustrated by the details of the character of the teeth from the species now under consideration.

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The *Cimepaye* of M. Fréd. Cuvier, the Simpai of the Malays, was first communicated to the Public by Sir Stamford Raffles, in his Descriptive Catalogue of a Zoological Collection made in the Island of Sumatra, under the name of *Simia melalophos*, &c. This Catalogue further contains two other new animals of this order, the CHINGKAU of the Malays—*Simia cristata*, *Raff.*; and the KRA of the Malays—*Simia fascicularis*, *Raff.*; which correspond precisely in characters to the *Simia melalophos*. The genus SEMNOPIITHECUS, defined by M. Cuvier, as far as it is known at present, consists of the three animals above mentioned—of the *Cercopithecus maurus*, the *Cercopithecus Entellus*, (*Dufr.*) and of another species, which has been added to the Museum of the Honourable Company from Java.

The name of *Semnopithecus* is applied to this genus by M. Fréd. Cuvier, in consequence of the grave and serious character of the animals which compose it. With this character the *Semnopithec*i combine a peculiar system of dentition, which is described and illustrated by a figure in the work above mentioned. From the materials deposited in the Museum at the India House, I have prepared the following details, descriptive of the characters of the *Semnopithecus maurus*, as observed in Java.

It should first be observed, that the new genus which has been established by M. Fréd. Cuvier, should be placed, according to his views, in the order of *Quadruman*a, between the Gibbons and the Guenons, or between the genus *Hylobates* of Illiger, and *Cercopithecus*, as defined at present. The comparisons which I have been enabled to make of the skulls of various *Semnopithec*i and of Gibbons, tend to confirm the propriety of this disposition. The skull of the *Semnopithecus maurus* in particular, has the same form as that of the adult *Simia syndactyla*, (*Raff.*)—the Gibbon from Sumatra; which was described in the last Number of these Researches. It is oblong, increasing in breadth posteriorly; the orbits advance greatly in front, and form a short tube surrounding the eye. The temporal ridges, although they do not project far from the surface of the skull, shew themselves in a slight eminence, arising from the orbital margin, and pursuing, parallel to each other, a longitudinal course towards the occiput. The abrupt termination of the posterior part of the skull is similar in the *Semnopithec*i that I have examined, and in the Gibbon; but the muzzle in our genus is proportionally shorter than in *Hylobates*.

The teeth present the following particulars:—the front teeth, in the upper jaw, are very regularly disposed; the intermediate teeth are broad, with an uniform edge; the lateral teeth are narrower, and rounded at the extremity. The canine

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teeth are long, acuminate, triangular, slightly tending outward and twisted, with a deep longitudinal groove along the surface, that faces the opposite tooth, and an obsolete groove along the inner surface. Of the grinders, the second bicuspidate is somewhat larger than the first; they are both divided by a deep longitudinal groove, and the exterior point is considerably more prominent than the interior. The structure of the first and second of the quadricuspidate is perfectly uniform; the crown is divided by a longitudinal and by a transverse groove, which constitute four elevated acute points: the third quadricuspidate differs from the others, in being terminated posteriorly by a very obscure ridge. Of the front teeth, in the lower jaw, the intermediate teeth are both longer and broader than the exterior teeth; the latter have a slight curvature, and an obsolete heel at the base, which affords them a peculiar character. The canine teeth are shorter than the corresponding teeth in the upper jaw, nearly vertically disposed, slightly arched, rounded anteriorly, and obsoletely grooved posteriorly. The first grinder, which follows, has a structure essentially different from the first bicuspidate in man; it is pyramidal, and terminates in a single point, which is very acute, and projects far beyond the regular series of grinders. The angular surfaces are unequal. The largest, which affords the most distinguishing character to this tooth, is situated anteriorly and exteriorly; it constitutes a very extensive oblique plane, which, in mastication, is applied to the broad interior surface of the canine tooth in the upper jaw: a smaller plane meets this from the opposite interior side of the tooth, and constitutes a sharp ridge, rising to the point of the tooth, which is somewhat obliquely truncated by a rough serrated edge: posteriorly, the tooth is defined by a smaller exterior and interior surface. The next tooth, which answers to the second bicuspidate, has generally the same form as the corresponding tooth in the upper jaw, but a small additional ridge exists posteriorly near the base of the crown. The first and second quadricuspidates agree with the corresponding teeth in the upper jaw, presenting individually four regular acute points; but the third has an additional fifth point, at its posterior extremity, occupying nearly two-thirds of the breadth of the tooth, but, being above, less acute than the other points. It may be observed, that the grinders in the lower jaw are, upon the whole, narrower than these teeth in the upper jaw.

I refer to the Plate of Illustrations annexed to this Number for an accurate view of the teeth as above described. In letters *A. B. C. D. E. F. & G.* all the details are carefully represented, and the separate parts are referred to in the Explanation of the Plate. My principal object has been to exhibit accurately the first grinder in the lower jaw, so as clearly to illustrate the description: it is represented therefore both in connexion with the general series, and separated from it. The

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peculiar structure of this tooth among the Quadrumana, first presented itself to me in the examination of the *Simia Syndactyla* (*Raff.*); and in the description of that animal, it is represented as having "one high, acute, conical, or pyramidal point, projecting considerably beyond the second bicuspidate, with an oblique edge, corresponding to the canine tooth in the upper jaw:" and I have added an accurate view of this tooth from the materials forwarded from Sumatra by Sir Stamford Raffles, and deposited in the Museum of the Royal College of Surgeons, which were referred to in the last Number of these Researches. At the same time, I have given a detailed view of the general series of the teeth of the adult Siamang, as belonging to the Gibbons, the genus most nearly allied to *Semnopithecus*. I have also added, from the Museum of Joshua Brooks, Esq., a view of the teeth of the Siamang, as they appear in the young subject. The peculiar structure of the first grinder in the lower jaw, as above described, shews itself in all Quadrumana, and affords a distinctive character between this order and man. Its degree of development in the Gibbon appears from the annexed Plate. In the various species of *Semnopithecus* it is still more developed, and particularly in the Chingkou and in the Kra. In the genus *Cercopithecus* it exists in the highest degree. M. Fréd. Cuvier, in the work referred to, "*Des dents des mammifères, &c.*," has also observed and described this structure in the Pongo, (which, according to the conjecture of the Baron G. Cuvier, is the adult Orang-utan,) as well as in the *Cercopithecus* and the other Quadrumana of the ancient continent. By systematic writers in general it is not mentioned. It requires a more particular degree of attention than it has received; and the generic descriptions of the Quadrumana hitherto given, are imperfect, as far as regards the character of the first grinder in the lower jaw.

The individuals belonging to the genus *Semnopithecus* are distinguished, more than any other Quadrumana, by a great length of body, and by a slenderness of the extremities. In the *Simia melalophos*, (*Raff.*) the *Simpai* of the Malays, these characters shew themselves in the highest degree. The *Semnopithecus maurus*, which is now under consideration, has, on the whole, a stouter make, and more robust extremities: it is one of the largest species of this genus; one of the specimens in the Museum at the India House, measures two feet and three inches from the tip of the nose to the root of the tail. The general physiognomy of the animals belonging to this genus is that of the *Cercopithecus*; but they have a peculiar character in the flatness of the face, and in the attenuated form of the body from the breast to the loins. The form of the head of the *Semnopithecus maurus* is already exhibited in the description of the skull: it is lengthened from the forehead to the occiput, compressed at the sides, considerably rounded posteriorly, and

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narrowed at the jaws. The general character of the face is a flatness above, and a protrusion of the maxillæ; but the appearance of the face differs greatly in old and in young subjects. The maxillæ become extended as the animal advances in age, and in young subjects the facial angle is proportionally greater.

The face is regularly circumscribed by hairs, which are long, and closely applied to the head; the forehead, which is gradually sloping, is entirely concealed by them. The orbits of the eye are rather prominent, and the bones of the nose short. The nose consists of an angular ridge, which is considerably elevated between the eyes, and terminates, without any fleshy protuberance, by a membrane which is gradually attenuated below, and on each side of which the nostrils are placed. These are large, oblong, slightly curved, and pass backward into the cranium, in a horizontal direction. From the termination of the nose to the mouth, a considerable space intervenes; but the lips are small and thin, so as to exhibit, when slightly retracted, the interior of the mouth. The chin is short and small; a circle of gray hairs incloses the mouth in the adult animal; and on the chin the hairs have a disposition downward, so as to exhibit the appearance of a beard. The upper part of the face is nearly naked; a few straggling, stiff hairs are scattered on the cheeks and the upper lip, and on the more prominent part of the nose an interrupted series is observed. The irides of the eyes are of a dark brown colour. The ears are concealed from view by the long hairs which cover the lateral parts of the head; they are margined, and both in form and disposition of external parts, closely resemble these organs in man. The neck is short, and considerably contracted. The trunk is of great length, broad and robust about the shoulders and the breast, and gradually of smaller dimensions towards the loins. The buttocks are marked with very large, rough callosities. The mammæ, in the adult female, are lengthened and cylindrical. The tail is as long as the body and head taken together; in some individuals, and particularly in young subjects, it exceeds these parts in length: it is cylindrical during the greatest part of its length; the base is gradually tapering, and the tip is thickened, and terminated by a close tuft of long hairs, of an ovate form.

The most distinguishing character of the animals of this genus is the great length of the extremities: the arms and forearms are particularly slender; the posterior extremities are more lengthened and more robust; so that in the most usual attitude of moving, the rump is considerably elevated. The hands and fingers of the anterior extremities have a length and delicacy proportioned to these members; the thumb is very short and small, and removed far from the fingers. The hands of the posterior extremities are of extraordinary length, calculating, from the origin of

SEMNOPIITHECUS MAURUS.

the tarsus, which is naked below, and comprises nearly one half of the length of the hand. The thumb is very robust, and placed near the fingers, so as to assist in rendering complete the movements and offices of the hands of these extremities. The length and stoutness of the fingers are proportionate to the stoutness of the thumb. The nails of the fingers are uniformly rounded, and elevated in the middle; and of the thumbs, of both extremities, flat and depressed.

The covering of the *Semnopithecus maurus*, in adult subjects, is intensely black on every part, except the breast, the abdomen, the inner side of the extremities, and the root of the tail; these parts are gray. On the crown of the head, the black hairs are slightly tipped with gray; and as age advances, the gray portion becomes more extensive, and also shews itself on the upper parts of the body; but the extremities exteriorly, and the tail, even in the oldest subjects, retain their blackness. The hairs are remarkably long, delicate, soft, and silky. On the sides of the head they are disposed backward, with a slight inclination outward, and they completely conceal the ears. They rise with a gradual slope on the forehead, but on the crown of the head they are suddenly deflected, so as to form a dependent crest. On the back and on the extremities they lie smooth and close. They are greatly elongated on the sides of the body, between the shoulders, so as to hang down to a considerable length, when the animal walks on all fours. On the breast anteriorly, and on the abdomen, they are short, lax, and straggling.

The covering of the *Simia maura*, in its young state, exhibits a great contrast to that in the adult. Immediately after birth, our animal has a fulvous or reddish-yellow colour; as it advances in age, the colour gradually changes. A gray discolouration first shews itself on the hands, the forehead, and the tip of the tail; from these parts it gradually extends to the neck, the shoulders, and the flanks, and assumes from time to time a darker hue, until the coat of the animal is jet black above, and gray underneath.

DIMENSIONS.

	Feet	Inches
Length of the body and head, from the extremity of the nose		
to the root of the tail.....	2	3
..... the tail	2	4
..... the anterior extremities	1	4 $\frac{1}{2}$
..... the posterior extremities.....	1	8

The *Semnopithecus maurus* is distinguished among the Javanese by the name of BUDENG, from another species, which has the same form and habit, but a

SEMNOPIITHECUS MAURUS.

different external covering. The name of the latter is LUTUNG; but the Malays and Europeans apply this name to both species, and distinguish them by the epithet of black and red; the Budeng being denominated *Lutung itam* "Maure," and the Lutung of the Javanese, *Lutung mera*. In Sumatra the name of the "Maure" is LOTONG.

The Budeng, or the black species, is much more abundant than the Lutung, or the red species; and the latter, both on account of its variety and comparative beauty, is a favourite among the natives. Whenever an individual is obtained, care is taken to domesticate it, and it is treated with kindness and attention. The Budeng, on the contrary, is neglected and despised. It requires much patience, in any degree to improve the natural sullenness of its temper. In confinement it remains during many months grave and morose; and as it contributes nothing to the amusement of the natives, it is rarely found in the villages, or about the dwellings. This does not arise from any aversion on the part of the Javanese to the monkey race: the most common species of the Island, the *Cercocebus Aygula* of Geoffroy, the Egret Monkey of Pennant, is very generally domesticated; and a favourite custom of the natives is to associate it with the horse. In every stable, from that of a Prince to that of a Mantry, or chief of a village, one of these monkies is found; but I never observed the Budeng thus distinguished.

The *Semnopithecus maurus* is found in abundance in the extensive forests of Java; it forms its dwellings on trees, and associates in numerous societies. Troops, consisting of more than fifty individuals, are often found together. In meeting them in the forests, it is prudent to observe them at a distance. They emit loud screams on the approach of man, and by the violent bustle and commotion excited by their movements, branches of decaying trees are not unfrequently detached, and precipitated on the spectators. They are often chased by the natives, for the purpose of obtaining their fur; in these pursuits, which are generally ordered and attended by the chiefs, the animals are attacked with cudgels and stones, and cruelly destroyed in great numbers. The skins are prepared by a simple process, which the natives have acquired from the Europeans, and they conduct it at present with great skill. It affords a fur of a jet black colour, covered with long silky hairs, which is usefully employed, both by the natives and by Europeans, in preparing riding equipages, and military decorations.

The Budeng, during its young state, feeds on tender leaves of plants and trees; and when adult, on wild fruits of every description, which are found in great abundance in the forests which it inhabits.



One Foot

SEMNOPIITHECUS PYRRHUS.

Drawn by R. Darnley

Engraved by W. Taylor.

SEMNOPIITHECUS PYRRHUS.



ORD. II^{de} QUADRUMANES, *Cuvier*. 1^{re} Famille, les Singes.

ORD. I. PRIMATES, *Linn.* Syst.

ORD. II. POLLICATA, *Illiger*. Fam. 2, Quadrumana.

SEMNOPIITHECUS, *Fréd. Cuv. Mamm. lithogr.* 30 livrais.

SIMIA, *Linn. Cuv. Schreb.*

CERCOPITHECUS, *Briss. Erxleb. Cuv. Illig. Geoff.*

CHAR. ESSENT. GEN.—*Laniarii* superiores obsolete triangulares, interne longitudinaliter sulcati. *Molares* inferiores postremi quinquedentati. *Pedes* elongati.



Semnopithecus rufus nitore splendide-fulvo, pectore abdomine artubus intrinsicis caudæque basi subtus pallide-flavis.

Lutung, of the Javanese.



ON the Plate which illustrates the present article, an animal is represented which agrees with the *Semnopithecus maurus* in all points excepting the external covering. The permanency with which this exists, and the peculiar name of our animal among the natives of Java, must be taken into consideration, in determining its title to a specific distinction. The colour extending over the upper parts of this animal, and over the exterior of the limbs, is essentially different from the fulvous tint observed in the *Semnopithecus maurus*, before the change of colour to black takes place, which, commencing on the extremities, spreads gradually over the whole animal. No discoloration of this kind occurs in the *Semnopithecus Pyrrhus*. Various young individuals, contained in the Honourable Company's Museum, exhibit, in a striking manner, the changes which occur in the covering of the *Semnopithecus maurus*, as it gradually increases to maturity. Three adult specimens of the *Semnopithecus Pyrrhus* agree in all points, as far as regards their colour. I am sensible of the difficulty which frequently occurs in distinguishing animals specifically: and if doubts still remain regarding the specific distinctions of quadrupeds which are natives of Europe, the same may be expected in animals from

SEMNOPIRHECUS PYRRHUS.

distant parts of the globe. In exhibiting our animal with a peculiar name, and thus proposing an addition to the Systematic Catalogue, I shall not oppose my judgment to those Naturalists who, after instituting a careful comparison, may be disposed to consider it merely as a variety of the *Semnopithecus maurus*.

Our animal agrees strictly with the *Semnopithecus maurus*, as described in the Fourth Number of this Work, in all points that regard generic character. A remarkable attribute of this is a great length of body and slenderness of the extremities; the figure of the *Semnopithecus Pyrrhus* exhibits these peculiarities of form, which are concealed in the attitude of the *S. maurus*. The lighter tints of the breast and abdomen are also rendered conspicuous in our present figure.

The hairy covering of the *Semnopithecus Pyrrhus* has the same character as in the *S. maurus*; it is long, delicate, soft, and silky. Its colour, in the latter, is intensely black; in the former, it is reddish-brown, with a beautiful golden gloss on the back, head, tail, and the extremities, varying slightly in its degree of intensity as it approaches the sides and forehead: underneath and along the interior of the extremities it is pale yellowish, with a golden lustre. The long, shaggy, thickly disposed fur which covers the upper parts, is separated by a regular boundary stretching along the hypochondriæ, from the hair on the abdomen, which is very thinly disposed, curled, silky, and of a very delicate texture.

Our animal greatly resembles, in its external covering, the *Cercopithecus auratus*, described by M. Geoffroy St. Hilaire in Vol. XIX. of the *Ann. du Mus.*, from a specimen in the collection of M. Temminck; but the latter has a clear distinguishing character in the black mark above the rotula; and, as far as appears from the description, is of a more robust habit, and does not belong to the genus *Semnopithecus*, as defined by M. Fréd. Cuvier.

Our animal, when full grown, is equal in size to the *Semnopithecus maurus*.



3 Inches.

TARSIUS BANCANUS.

TARSIUS BANCANUS.



ORD. II^{de} QUADRUMANES, *Cuvier*. 2^{de} Famille, les Makis, *Cuv.*

Les Lemuriens,—Strepsirrhini,—*Geoffroy St. Hilaire*.

ORD. I. PRIMATES, *Linn. Syst.*

ORD. II. POLLICATA, *Illiger*. Fam. 4. Macrotarsi.

TARSIUS, *Storr. Cuv. Geoff. Illig.*

LEMUR, *Pallas*. MACROTARSUS, *Lacep.*

DIDELPHIS, *Linn. Gmel.* PROSIMIA, *Bodd.*

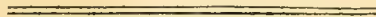
CHAR. GEN.—*Dentium formula*; *Primores* $\frac{4}{2}$ seu $\frac{2}{2}$, *Laniarii* $\frac{1-1}{1-1}$, *Molares* $\frac{6-6}{6-6}$ seu $\frac{5-5}{5-5}$.

Primores dissimillimi, variables, supra aliis 4 aliis 2, intermedii longiores acuti (aut nulli), 2 externi minimi: infra 2 erecti (aut obliqui). *Laniarii* utrinque primoribus breviores. *Molares* utrinque utrinsecus 6 (interdum 5) anteriores unicuspidés, laniarios æmulantes, posteriores majores multicuspidés.

Rostrum breve acutum. *Oculi* magni, antrorsum versi, approximati. *Auriculæ* nudæ magnæ aut mediocres. *Cauda* longissima apice floccosa. *Pedes* omnes manibus pentadactylis. *Tarsi* longissimi. *Ungues* lamnares, triangulares, plani exceptis digiti secundi et tertii pedum posteriorum qui sunt verticales, subulati, erecti.



Tarsius fuscus, dentibus primoribus intermediis maxillæ superioris nullis, auriculis rotundatis horizontalibus capite brevioribus.



ALTHOUGH the Tarsius from Banca agrees in the essential points with the other species of this singular genus, which have hitherto been discovered, it exhibits the following peculiarities. It has no intermediate front teeth, and the exterior tooth on each side is, comparatively with the other species, extremely minute. Counting (with Desmarest) one canine tooth on each side, above and beneath, it has only five grinders in each jaw. The ears, instead of rising in an erect position, are placed horizontally backward, and are proportionally short. On its structure and peculiarities I have further to add the following remarks:—The head, in proportion to the size of the body, is large; the arch of the forehead rises high, and the occiput is regularly spheroidal. The proximity of disposition and excessive size of the eyes, is equally characteristic in this as in other species. The rostrum, or extremity of

TARSIUS BANCANUS.

the face, is short and obtuse; the nose is slightly rounded, almost flat above, and the nostrils, as usual in this genus, are pierced laterally. The ears, which, from their erect position, and their projection beyond the cranium, give a peculiar distinctive character and appearance to the other species, in our animal are disposed horizontally, and instead of rising up toward the crown of the head, incline backward, and extend but little from its sides; the lobes, as usual, are very thin, membranaceous, semitransparent, thinly beset with delicate hairs; several tufts of longer hairs arise from the base, where the interior membranaceous lobules are discovered, but in our specimen too much contracted to admit of a detailed description. The neck is very short, and the anterior extremities have the same proportion to the body as in the other species. The hands are externally covered with a very soft down; internally they are naked, and provided with several rather prominent protuberances, which, according to the opinion of Mr. Fischer, are calculated to assist the animal in climbing. The fingers are deeply divided, and very delicate; those of the hands have the same proportion, one to the other, as they have in man; on the feet they are more lengthened, and slender; the third finger is longer than the middle finger, and the thumb is proportionally short. In all the third phalanx is somewhat thickened, and surrounded by a projecting orbicular border, which, in the thumb particularly, constitutes a delicate ball, supporting the nail. The nails of all the fingers of the hand, as well as of the thumb and the third and fourth finger of the feet, are triangular, and represent a delicate compressed scale: on the index and middle finger of the feet they are erect, sharp, compressed, slightly curved, and not inaptly compared by Mr. Fischer to the thorns of a rose-bush, constituting one of the essential characters of this genus. The body is handsomely formed, and, as in the other species, somewhat contracted towards the pelvis; the lower extremities also have in general a similar character, but the tarsus has less of the extravagant length which is common to the other Tarsii. The tail has nearly the length of the body and head taken together; it is somewhat thicker at the base, nearly naked two-thirds of its length, but covered towards the extremity with a soft down, which forms, near the tip, a very obscure tuft. The fur is remarkably soft to the touch; it is composed of a thick and very delicate wool, which envelopes the body, head, and extremities, forming a coat of an unequal surface, from which irregular straggling hairs project; at the root of the tail, and at the hands of both extremities, it terminates abruptly in form of a ring. The general colour is brown, inclining to gray; on the breast, abdomen, and interior of the extremities it is gray, inclining to whitish: a rufous tint is sparingly dispersed over the upper parts, which shews itself most on the head and extremities: the naked parts of the tail near the root are considerably darker than the extremity.

I obtained this animal in Banca, near Jeboos, one of the mining districts, where it inhabits the extensive forests in the vicinity.

TARSIUS BANCANUS.

As the teeth of the *TARSIVS BANCANUS* differ in several particulars from those of the other *Tarsii*, it may contribute to the elucidation of this genus, to present a detailed description of them, with reference to the Plate of Illustrations.—See Pl. of Ill. Let. G. (*a*) upper-jaw, 1 front tooth; 2 Canine; 3, 4, 5, 6, 7, Grinders: (*b*) lower-jaw, 1 front tooth; 2 Canine; 3, 4, 5, 6, 7, Grinders.

I shall further add an enumeration of the different species of this genus that have hitherto been described, with their characters, as given by Professor Gotthelf Fischer in the Works cited.

Teeth of Tarsius Bancanus.—*Front Teeth*: in the upper-jaw none intermediate; exteriorly, one on each side, minute, cylindrical, consisting of a simple point, projecting about one-third of a line beyond the gums: in the lower-jaw, two intermediate, long, attenuated towards the point, which is slightly rounded, projecting obliquely forward, diverging in a small degree from the middle, where they approach nearest to each other, surrounded at the base by a slightly projecting margin. G. *a*, 1. *b*, 1.

Canine Teeth.—In the upper-jaw one on each side, slender, somewhat angular, acute, inclining obliquely inward: in the lower-jaw one on each side, attenuated, compressed, somewhat shorter than the front teeth, but closely applied to them above, and having the same direction. G. *a*, 2. *b*, 2.

Grinders.—In the upper-jaw five; the first rather broad at the base, angular, simple, pointed: the second and third smaller than the first, but larger successively, somewhat compressed, each having a single point, with an additional projection anteriorly and posteriorly, representing a compressed base, from which the point rises: the fourth and fifth very large, and nearly equal, consisting of a broad base, from which project three high, acute, somewhat angular points, one on the interior, and two on the exterior margin, having in the middle a considerable concavity: in the lower-jaw five, the three anterior consisting of a single point; the first broad at the base, pyramidal, acute, somewhat oblique, encircled at the base by a margin, larger than the second and third, which being removed somewhat interiorly, in consequence of the curvature of the lower-jaw, have a disposition slightly different from the corresponding teeth in the upper-jaw: the fourth and fifth are large, and resemble those which are opposed to them; the points on their surface are less regular; they form two transverse ridges in the anterior and posterior part of the crown, between which is a considerable groove. G. (*a*) 3, 4, 5, 6, 7. (*b*) 3, 4, 5, 6, 7.

TARSIUS BANCANUS.

SPECIES OF TARSIUS HITHERTO DESCRIBED.

- 1.—*Tarsius Palassii*: T. incisoribus obtusis, intermediis brevibus. *Gotthelf Fischer, Anat. der Maki.*

T. sulphureo brunneus, auriculis acuminatis. *G. Fischer, Zoognosia.*

- 2.—*Tarsius Daubentonii*: T. incisoribus acutis, intermediis rotundatis longis. *G. Fischer, Anat. der Maki.*

T. gracilis ex nigro cinereus auriculis rotundatis. *G. Fischer, Zoognosia.*

- 3.—*Tarsius Fischeri*: T. incisoribus acutis, intermediis longis latere exteriori depressis crista acuta obductis, marginatis. *G. Fischer, Anat. der Maki.*

T. badius, pedibus ex nigro fuscis auriculis rotundatis. *G. Fischer, Zoognosia.*

- 4.—*Tarsius Bancanus*: T. fuscus, incisoribus intermediis maxillæ superioris nullis, auriculis rotundatis horizontalibus capite brevioribus.



CHEIROMELES TORQUATUS.

Engraved by W. Taylor.

London, Published by Kingsbury, Parbury & Allen, Leadenhall Street, Apr. 1. 1844.



CHEIROMYLES TORQUATUS.

Drawn by W. Day

CHEIROMELES TORQUATUS.



ORD. III^{me} CARNASSIERS, *Cuvier*. 1^{re} Famille, Les Cheiroptères.

ORD. I. PRIMATES, *Linn.* Syst.

ORD. XI. VOLITANTIA, *Illiger*. Fam. 32, Chiroptera.

CHEIROMELES, Nobis.

CHARACTER ESSENTIALIS.—*Dentes primores* utrinque duo; supra magni, approximati, semiconici, acuti, infra minimi, simplices. *Rostrum* conicum, sulcatum, glandulis confertis setiferis in paribus tribus oppositis coronatum. *Auriculæ* distantes, patentés, operculo brevi, semicordato, obtuso. *Saccus* axillaris amplus, ad regionem hypochondriorum extensus, antice membrana pectorali, postice patagio complexus. Scelidum *podaria* manus sunt. Halluce ungue lamnari, extrorsum serie secunda setarum uncinatarum marginatus.

CHARACTER NATURALIS.—*Dentes primores* supra duo, magni, approximati, ab laniariis paululum remoti, conum per axin sectum referentes, latere interiore recto conniventes, latere exteriori, laniarios spectante, obliquo, antice læves, subconvexi, postice basi marginati, concavi, attenuati; infra duo minimi, simplices, basi cylindrici, scalpro compresso æquali. *Laniarii* supra mediocres, erecti, trigoni, latere anteriore obsolete canaliculati, angulo interiore sectorio, gradu basilari cincti; infra breves, parum extrorsum spectantes, obtusiusculi, basi antice marginati, postice gradu semilunari emarginato præditi. *Molares* supra utrinsecus quatuor; primus externe acie subelongata trigona, interne ad basin gradu obliquo instructus, secundus et tertius consimiles, margine exteriori bipartito ex columnis duabus triquetris tricuspidatis confluentibus efformato, gradu interiore magno obsolete bituberculato, concavo, obliquo, subemarginato, tuberculo anteriore elatiore. Quartus parvus compressissimus transversus. Infra utrinsecus quinque, compressi. Primus minimus dentibus proximis occultatus, vix supra gingivam conspicuus; secundus acie sectoria elongata, margine interiore basilari producto; tertius, quartus, et quintus consimiles, coronide quinquecuspidato, cuspidibus tribus anterioribus in trigonum dispositis, duabus posterioribus oppositis; quintus parte posteriore angustato obliquo.

CHEIROMELES TORQUATUS.

Caput oblongo-cylindricum; calvaria supra longitudinaliter cristata. *Rostrum* conicum, supra sulco longitudinali exaratum, glandulis confertis, setiferis, erectis, in fasciculis tribus oppositis, coronatum. *Rhinarium* productum apice emarginatum, prosthemate nullo. *Nares* tubulosæ, tumidæ, antrorsum spectantes, simplices. *Labrum* crassiusculum, carnossum, simplex.

Auriculæ mediocres, distantes, patentēs, obtusæ, margine posteriore involuto: *operculum* breve, semicordatum, obtusum. *Oculi* parvi, margini anteriori auriculæ approximati, illoque partim absconditi.

Corpus patagio digitali, lumbari et anali, membranaceis, denudatis, cinctum. *Saccus* lateralis amplus, ab axillis post pectoris parietes, versus dorsum et regionem hypochondriorum extensus, antice membrana pectorali versus brachium extensa, postice patagio corporis complexus. *Mammæ* subaxillares, laterales, membranæ pectorali et patagio intermediæ. Patagium anale mediocre, integrum, rugosum, fibris muscularibus pluribus præditum. *Cauda* compressa, subcylindrica, obtusa, annulis membranaceis cincta, raropilosa, basi patagio anali adnata, ultra medium libera.

Pedes pentadactyli. *Antipedes* chiropteri, brachiis digitisque elongatis, his muticis, halluce libero, unguiculato. *Scelidum podaria* halluce maximo, crasso, libero, a reliquis digitis separato, instructa; ungue lamnari elongato. Series setarum hallucis secunda; setis apicalibus longissimis, lateralibus gradatim brevioribus, omnibus uncinatis. Digi ti quatuor compressi subæquales, unguibus falcularibus. Pili longi, setacei, digitis unguibusque rare adpersi.

AFFINITAS. Ab omnibus Vespertilionidis hucusque cognitis satis distinctum genus Cheiromeles, Nyctinomo pluribus notis convenit. Podaria scelidum halluce libero lato-unguiculato instructa, aliquam affinitatem cum Quadrumanis Prosimiis indicant. Quærendum igitur, nonne Systemate naturali dispositio generum Vespertilionidarum commutanda? Galeopithecus et Pteropus a Quadrumanis removendi? Ast Cheiromeles illis contra associandus? et hoc genus nostrum constituatne cum Nyctinomo, Molosso, Dysope, et Myopteri familiam naturalem?

Cheiromeles collo pilis longiusculis cincto, dorso punctato nudo.

CHEIROMELES TORQUATUS.

I have designed for the present article one of the subjects which have been added to the Museum of the Honourable East India Company, by the researches of Dr. George Finlayson. The various Vespertilionidæ enumerated in the journals which were kept by this meritorious Naturalist, during the mission of John Crawford, Esq. to Siam, Cochin-China, and the Indian Archipelago, were collected in Penang and Singapore. The chief notices concerning them relate to the places where they were discovered, as the examination was deferred to a period of rest and leisure. Since the lamented decease of Dr. Finlayson, a liberal provision has been made by the Honourable Court of Directors, for arranging and exposing to view his collections; and I trust that the description of the new and interesting subjects will prove the zeal and industry of the collector. As a native of the Indian Archipelago, the *Cheiromeles torquatus* belongs with propriety to the limits of these Researches.

In its physiognomy our animal bears considerable resemblance to *Molossus*, and, on first view, it was considered as a species of this genus; but a more careful examination soon brought to light its peculiar characters. The singular structure of the foot, or rather of the *podarium*, according to Illiger's language, which in the posterior members has the character and properties of a hand, has suggested the name of *CHEIROMELES*, from $\chi\epsilon\iota\rho$ *manus*, and $\mu\epsilon\lambda\omicron\varsigma$ *membrum*.

The entire length of the specimen of the *CHEIROMELES TORQUATUS* which is now before me, is five inches and one half. The extent of the wings is nearly two feet. The head is long, somewhat cylindrical in its posterior portion, very slightly rounded above, and terminated by a long conical muzzle, the extremity of which projects nearly half an inch beyond the lower jaw. The summit of the skull is marked in the middle with a distinct prominent longitudinal ridge, and the rostrum has throughout its entire length a deep groove, which forms at the extremity a small notch between the nostrils. The nose consists of two tubes, of considerable length, and somewhat muscular, at the end of which the nostrils are placed. These are simple, orbicular and tumid, and the external aperture is directed forward. The upper lips are simple, fleshy, thick, almost naked, and bordered with delicate and somewhat rigid hairs. The lower jaw is broad and obtuse at its termination. The rostrum is marked above, on each side, with three small fascicles of short, stiff bristles, conical and glandular at the base, rigid and spinous at the point. They are arranged successively, in opposite pairs, at the extremity, in the middle, and near the base of the ears; a similar fascicle of bristles, with glandular bases, is situated on each side of the lower jaw, near its extremity. The ears have comparatively a posterior

CHEIROMELES TORQUATUS.

position. The auricle is very broad at the base, and extends along the skull from the eyes towards the neck : posteriorly it forms a curve, which rises again to a large tragus, placed exteriorly below the auricle. It is about two lines long, semicordate, obtuse, and continued anteriorly into a small membranaceous border, extending towards the angle of the mouth. The auricle itself is oblong, nearly obtuse, simple at the anterior, and involute at the posterior margin. The general direction of the ears is upward and outward. The base of the auricle leads to a tube of great transverse dimensions. Indeed, the great extent of the internal ear is one of the peculiarities of *Cheiromeles*. The diameter of the entrance to the cavity of the tympanum is likewise of extraordinary size : in preparing the skull, the bones of the ear were easily separated for examination, and, in comparison with those of the human ear, were found of enormous dimensions. In the skull all the parts belonging to the ear are greatly developed, and the cochlea in particular is of uncommon extent. The texture of the os petrosum was apparently very loose.

The eyes are small, and partially concealed. The eyelids are surrounded by a minute circle of rigid hairs, regularly disposed. The anterior margin of the auricle is adapted to afford a partial covering and protection to the eyes. The front teeth in the upper jaw resemble a section of a cone through the axis : they are of great strength ; those in the lower jaw are comparatively small. The canine teeth above have a sharp edge along their internal angle, but in other respects these teeth are of moderate size, and of simple structure. The large grinders agree in all essential points with those of *Nyctinomus* ; but this agreement will be shewn more fully in the comparison of *Cheiromeles* with that genus.

Of all the *Vespertilionidæ* with which I am acquainted, the *Cheiromeles torquatus* has, next to the *Nyctinomi*, the greatest extent of wing. The phalanges of the third and fourth fingers are remarkably long and delicate. Our animal possesses a peculiarity of structure at the union of the arm with the body, similar to that which has already been observed, in different degrees of development, in several *Vespertilionidæ*. It consists of a deep cavity, extending from the axilla and neighbouring parts, towards the spine and the hypochondriæ. Anteriorly it is bounded by a membrane extending from the arm to the pectoral muscle, and then passing to the sides of the body, and uniting with the common integuments : the expanded membrane of the arms and body is its posterior limit. The cavity thus formed is about an inch deep, and nearly two inches long ; it is lined with a very delicate membrane, and its uses will be pointed out in the sequel. A structure analogous to this occurs in the *Pteropus palliatus* of Geoffroy, and in the genus *Cephalotes*. In the *Saccopteryx*

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of Illiger, a smaller sac is observed, but in a different situation. It is placed about the middle of the forearm, and has no connexion with the axilla. It here appears to be of less importance in the economy of the animal. In the *Pteropus palliatus*, and in the genus *Cephalotes*, it consists not merely in a cavity in the axilla and the neighbouring parts, but the membrane, being detached entirely from the parietes of the thorax and abdomen, rises from the middle of the back, where the skin forms a ridge of two or three millimetres in height: from this it is spread, as a mantle, over the animal. This organization, M. Geoffroy remarks, renders the animal specifically lighter, and assists its flight; and, by supplying a deep and extensive pouch, it affords to the young, while they continue at the breast, a convenient covering, and a retreat in which they find the security and the temperature which they require. The pouch in *Cheiromeles torquatus*, although less extensive, answers the same purposes. It has been attempted in the illustrations which are given on the Plate exhibiting a front view of the *Cheiromeles torquatus*, to shew the disposition and extent of this singular pouch; but a more distinct view, as well as a more satisfactory description, are still to be supplied by the examination of the living animal, or by specimens preserved in spirits, in which all the parts remain in their natural state, and not deranged by the process of preparation. The breasts, or mammæ, are situated at the sides, a little below the axillæ; they are covered before by the membrane which bounds the pouch. The subject procured by Dr. Finlayson, from which this description was prepared, is a female.

The bones of the arm are of great length. The thumb is of moderate size, robust, and armed with a strong claw. In the index only one phalanx is distinctly observed; the middle finger consists of four, and the fourth and fifth fingers have individually three phalanges. The two first phalanges of the middle and of the fourth finger are of great length, and contribute, in a great degree, to the extent of the anterior extremities. The extreme phalanges are very slender and delicate. The posterior extremities are uncommonly robust. The thighs are enveloped in the interfemoral membrane; the legs are short, and covered with numerous folds of this membrane. The foot constitutes the chief distinguishing character of our animal. Its peculiar structure is perhaps most precisely expressed in the technical language of Illiger, as applied in the essential character: *scelidum podaria manus sunt*. This hand consists of four fingers, which have the same disposition and structure as in other animals of this family, and of a distinct thumb, essentially agreeing with this member in many *Quadrumana*, and in several animals of the *Rodentia* and *Marsupialia*. It is a complete antagonist to the fingers, enables the animal to take hold of objects,

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and thus constitutes a perfect hand. The metatarsus, in *Cheiromeles*, is broader than in other *Vespertilionidæ*. The metatarsal bone, supporting the thumb, is very robust; it is somewhat swelled at both extremities; at the point of articulation its situation is in a small degree oblique, so that the thumb at the base has a natural disposition to diverge from the fingers. The first phalanx is of great dimensions; in our specimen its sides are angular, and it has double the size of the fingers. The second and third phalanges are very minute, and cannot be distinguished separately. The nail is long, broad, perfectly even before, somewhat concave behind, and slightly rounded exteriorly at the extremity. It is proportionally longer than the nail in *Monkeys*, but it has the true character of the *Unguis lamnaris*, resembling in its structure the elongated nail of the *Prosimii* and *Macrotarsi* of Illiger. A very slight convexity exists in the anterior surface of the nail, and the posterior is proportionally concave; at the insertion of the nail the thumb is distended, and the sides are somewhat flat. Together with the structure and position of the thumb, a very peculiar character is afforded to the *Cheiromeles* by an appendage or brush, consisting of bristly hairs, directed to one side, and forming a regular series along the outer margin of the thumb. At the extremity the hairs are long, and spread as a fan over the nail; they gradually decrease in length as they approach the base, preserving throughout the same direction. The separate hairs are rigid, thicker at the base, then gradually attenuated, and terminated by a hook. To this singular character I have observed an analogous structure in *Nyctinomus*, by which it is in some measure illustrated. It is doubtless of importance in the economy of the animal, but its use remains to be determined. This character must not be confounded with the long, solitary, bristly hairs which, in *Cheiromeles* as well as in *Nyctinomus*, are loosely scattered over the fingers, and particularly over the extremity, near the insertion of the claws. The other fingers are compressed, disposed in the same direction, nearly of equal length, and armed with strongly compressed claws, agreeing essentially with those of other animals of this family. The skin which covers the base of the fingers is lax, and constitutes a short membrane between them.

The neck of the *Cheiromeles torquatus* is short and thick; the body large, ovate, broad between the shoulders, then gradually contracted, and obtusely terminated. The interfemoral membrane is short, transversely distended between the thighs, and obtuse, with a slight curve on each side of the tail. Its texture is thick and rugose, and it is, to appearance, plentifully supplied with muscular fibres. In this character *Cheiromeles* resembles *Nyctinomus* more than other animals of this family: in its termination, expansion, and rugosity, the interfemoral membrane of *Cheiromeles*

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agrees apparently with that of *Nyctinomus Ægyptiacus*. The tail, along one half of its length, is enveloped by the interfemoral membrane; the remaining portion is cylindrical, somewhat compressed, obtuse, and marked throughout its whole length with annular folds closely disposed and continued from the interfemoral membrane. A few straggling bristles are scattered over its base.

The exterior character of *Cheiromeles* is peculiar in various points. The back is nearly naked; an almost imperceptible down, of a brown colour, extending uniformly over it. The skin, which by reason of the vacancy occasioned by the cavities under the thorax and in the flanks, is contracted into wrinkles, is marked throughout with very minute dots, which, when closely examined, exhibit the appearance of shagreen. These dots also extend to the shoulders, and along the arm to the thumb, and over the interfemoral membrane; but, in the latter, they are partially concealed by a very delicate down, of a dark brown colour, which not only covers the membrane, but also extends, in a defined line, nearly half an inch in breadth, along the bones of the arm to the thumb. The shortness of the fur, affording an appearance of nakedness to the general surface, is characteristic of *Cheiromeles*. The longest hair on our animal is observed in a collar, or ruff, about the neck, from which the specific name is derived. This ruff, nearly half an inch in breadth, is irregularly defined. In its posterior portion the hair is soft and uniform in length; anteriorly it is unequal, silky, and delicate; and the hairs, meeting from the opposite side, and crossing each other, form a projecting brush in a middle. The breast and abdomen are covered with a very short, delicate, silky fur, of a dark brown, somewhat rufous colour, which is closely applied to the skin. A line of longer hairs, variegated with several tufts, marks the region of the pubes, and conceals the genitals. Short bristly hairs are scattered over the interfemoral membrane, extending to the root of the tail. All these hairs have a dark brown colour, with a rufous, somewhat resplendent tint, when exposed to the light. In the membrane of the wings, the back, head, ears, rostrum, feet, and tail, the colour is sooty black, with occasional modifications of tawny. The nails are transparent, and of a yellowish brown colour. The series of bristles along the exterior margin of the thumb is tawny. The membrane of the wings is marked with numerous parallel transverse veins. Several long, lax bristles are irregularly scattered over the face and lips.

I have endeavoured to detail with accuracy all the external characters of *Cheiromeles*: those which belong to it exclusively have been enumerated in the descrip-

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tion of the genus. I shall add a few remarks on its immediate relations. It has been stated as a query in the notice of its affinities, whether Cheiromeles, Nyctinomus, Molossus, Dysopes, and Myopteris should not form a separate subdivision in the family of Vespertilionidæ. As far as regards their front teeth, the resemblance between all these is strong; it is as follows:—CHEIROMELES $\frac{2}{2}$, MOLOSSUS $\frac{2}{2}$, MYOPTERIS $\frac{2}{2}$, DYSOPES $\frac{2}{4}$, and NYCTINOMUS $\frac{2}{4}$. These genera have likewise a striking affinity in the size and organization of the ears, in the nakedness of the nose, in the great expansion of the wing, and in the structure of the tail, enveloped at the base in the interfemoral membrane, and detached at the extremity. Among these, on first view, Cheiromeles appears to have the greatest resemblance to Molossus; but the comparisons which I have instituted, shew that it is still nearer to Nyctinomus; therefore, without entering into a separate analysis of the genera enumerated, and their affinity individually to Cheiromeles, I shall mention in detail only those particulars in which it agrees with Nyctinomus, as they appear in the form of the skull, in the teeth, in the structure of the ears, in the nose, in the anterior extremities, in the interfemoral membrane, in the tail, and in the brush-like appendage of the thumb and fingers. *First*:—The form of the *skull* in Cheiromeles and in Nyctinomus is almost precisely the same; to shew this, a comparison of the details which are given in our Plate, with those contained in the Illustrations to the Vth Number of these Researches, is sufficient. *Secondly*:—The front and canine *teeth* in both these genera have so nearly the same character, that the description of them in one may, with a very small modification, be applied to the other. The grinders likewise are constructed exactly on the same plan; but their analogy shews itself strongest in the lower interior ridge of the upper grinders, which is emarginate, and supports two points, of which the anterior is largest. *Thirdly*:—regarding the *ears* it may be remarked, that in Nyctinomus the auricle is larger, and has a more anterior situation; but in the great extent of this organ interiorly, in the form of the enlarged tragus, and in the covering which the auricle is calculated to afford to the eye, both these genera agree. *Fourthly*:—The nasal tubes and the end of the rostrum are similar in Nyctinomus and in Cheiromeles: both genera are distinguished by numerous conical spinous glands situated on the rostrum; but in Cheiromeles these are separated and distributed in various fascicles, while in Nyctinomus they are collected near to one point. *Fifthly*:—The agreement which exists between Cheiromeles and Nyctinomus in the anterior extremities, shews itself not so much in the size and form of the membrane, as in the great length and delicacy of the phalanges of the fingers. *Sixthly*:—The structure of the *interfemoral membrane*, and the muscular fibres with which it is provided, in both these genera

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affords a striking affinity ; this is very satisfactorily illustrated by a comparison of the *Cheiromeles torquatus* with the *Nyctinomus Ægyptiacus*, figured in the *Mem. de l'Institut d'Egypte*, &c. by M. Geoffroy. *Seventhly* :—The *tail* has likewise essentially the same structure, though it appears of greater dimensions in *Cheiromeles* from the membranaceous covering with which it is surrounded. *Eighthly* :—A very striking resemblance between *Nyctinomus* and *Cheiromeles*, and which, as far as my observation extends, has nothing analogous in the other genera above enumerated, exists in a brushlike appendage to one or to several fingers. In *Cheiromeles* it occupies the exterior side of the thumb, and has already been described in detail. In *Nyctinomus* both the exterior fingers, as well that which corresponds to the thumb, as the little finger, are provided with an appendage which has the following character. A series of delicate hairs, about one line in length, extends along the whole of the exterior side both of the thumb and of the little finger ; a few hairs of a greater length are scattered through these, and likewise stretch forward, and spread over the claw. These hairs rise nearly erect or vertically from the finger, and are not directed horizontally outward, as in *Cheiromeles*. The separate hairs are bent or hooked at the extremity ; their colour is silvery gray. This regularly defined series of hooked hairs must not be confounded with the long lax hairs which are observed on all the fingers of the *Nyctinomi*, and which, according to M. Geoffroy, must also be placed among the generic characters. These long irregular hairs are likewise observed in *Cheiromeles*, independent of the appendage of the thumb. It should be remarked, that in *Nyctinomus* the metatarsal bones of the thumb and of the little finger are perfectly uniform in size, slightly exceeding those of the interior fingers.

From the preceding comparison it clearly appears, that in a natural arrangement of *Vespertilionidæ*, *Nyctinomus* should immediately follow *Cheiromeles*. I am not prepared to state the order in which the other genera belonging to this group above enumerated, should be placed ; but *Cheiromeles* doubtless stands at the head of it, as possessing an affinity to the *Prosimii* or *Macrotarsi* of Illiger, not only in the structure of the thumb and its lengthened nail, but also in the carnivorous grinders, which are provided with projecting points. These considerations suggest a new disposition of the *Vespertilionidæ*, but this remains for future inquiry ; my immediate object has been to give the history of *Cheiromeles torquatus*, and to illustrate its affinities in this family.

On the Plates annexed to this article, an anterior and posterior view of *Cheiromeles torquatus* is exhibited. In the former the animal appears of natural size ; in the latter it is reduced nearly one-half : to this Plate the following illustrations are added.

CHEIROMELES TORQUATUS.

- A.* Profile of the skull of the *Cheiromeles torquatus*, of natural size.
- B.* Skull seen from above.
- C.* The same from beneath.
- D.* Lower jaw: to exhibit the teeth.
- E.* Profile of the teeth in the upper jaw, seen from within.
- F.* Profile of the teeth in the lower jaw, seen from without.
- G.* Front teeth of the same.
- H.* Front teeth of *Nyctinomus tenuis*.
- I.* Profile of the head of the *Cheiromeles torquatus*.
- K.* Podarium (hand) of the posterior members of the same.
- L.* Nail of the thumb, of the same.
- M.* Lateral view of the nail of the thumb, of the same.
- N.* Foot of *Nyctinomus tenuis*.
- O.* Front view of the axilla of the *Cheiromeles torquatus*.
- P.* Posterior view of the *Cheiromeles torquatus*, in which the extent of the axillary cavity is indicated by a dotted line.



3 Inches

NYCTINOMUS TENUIS.

Drawn & Engraved by W. Taylor.

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NYCTINOMUS TENUIS.



ORD. III^{me} CARNASSIERS, *Cuvier*. 1^{re} Famille. Les Cheiroptères.

ORD. I. PRIMATES, *Linn.* Syst.

ORD. XI. VOLITANTIA, *Illiger*. Fam. 32, Chiroptera.

NYCTINOMUS, *Geoffr. Desm.*

VESPERTILIO, *Buchanan, Commerson, Hermann.*

CHARACTER ESSENTIALIS.—*Dentes primores* supra duo, magni, infra quatuor, minimi, bifidi, oblique protrusi: *molares* supra exterius margine cuspidato, interius gradu abbreviato bituberculato emarginato: *laniarii* infra processu maximo spinæformi aucti; *molares* compressi, quinquecuspidati. *Rostrum* emarginatum, labro carnosolaxo plicato confluent. *Auriculæ* maximæ, vertice connexæ, operculo obtuso rotundato. *Brachia* phalangesque longissima. *Digiti* scelidum pilis longis laxis obtecti.

CHARACTER NATURALIS.—*Dentes primores* supra duo, magni, erecti, subcontigui, attenuati, obsolete tetragoni, antice leviter arcuati, postice excavati, latere exteriore laniarios spectante obliquo; infra quatuor, brevissimi, oblique protrusi, bifidi, laciniis rotundatis obtusis, intermediis majoribus laciniisque interioribus longioribus. *Laniarii* elongati, supra leviter deflexi, trigoni, lateribus obsolete canaliculati, angulo interiore sectorio, gradu basilari cincti; infra conici, basi maximi, approximati, processu spinæformi oblique divergente aucti, primores oblique antrorsum adigentes. *Molares* supra utrinsecus quinque; primus minutissimus, acutus, simplex, vix supra gingivam conspicuus; reliqui complicati, margine laterali exteriore elevato, gradu interiore abbreviato, sulcis intermediis profundis; secundus externe acie longissima, interne processu acuto simplici instructus; tertius et quartus consimiles, margine exteriore bipartito, singula parte cuspidibus tribus acutis, in trigonum dispositis, gradu interiore bituberculato, emarginato, tuberculo interiore elatiore; quintus minor compressiusculus postice obliquatus. Infra utrinsecus quinque, compressi, superioribus multo angustiores; primus et secundus breves, acuminati, unicuspidati,

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simplices, basi margine cincti; secundus paululum elongatus, margine posteriore proximo adpressus; tertius, quartus, et quintus consimiles, coronide quinque-cuspidato, cuspidibus tribus anterioribus in trigonum dispositis, duabus posterioribus oppositis; quintus parte posteriore angustata obliqua.

Caput depressum auribus fere absconditum. *Rostrum* longiusculum, carnosum, obtusum, emarginatum, membrana crenulata cinctum. *Labrum* laxum, plicatum, sensim rostro incrassato confluent, verrucis pluribus rugosum, setisque obtusis obsitum. *Nasus* prosthemate nullo. *Nares* laterales, subrotundæ, obscuræ. *Auriculæ* maximæ, antrorsum spectantes, frontem tegentes, vertice connexæ, margine membranaceo revoluta cinctæ; *operculum* obtusum, rotundatum, maximum. *Oculi* minimi, margine membranaceo auricularum inferiore obtekti.

Corpus patagio digitali, lumbari et anali, membranaceis denudatis, cinctum. Patagium anale mediocre, integrum. *Cauda* corpus fere æquans, basi patagio anali adnata, apice libera. *Mammæ* pectorales, gastræum et genitalia pilis tenuissimis mollissimis dense tectæ.

Pedes pentadactyli. *Antipedes* cheiropteri, brachiis digitisque elongatis, his muticis, halluce libero, unguiculato. *Scelides* ambulatoriæ. *Ungues* falculares, digitorum elongatorum antipedum nulli. Digiti unguesque scelidum pilis longis, laxis, setaceis tecti.

AFFINITAS.—Hoc et Molossi genus in adspectu, et aurium forma dispositioneque similia sunt. At naso simplici, rostro tumido, caudaque longa basi membrana adnata apice libera ut Molosso sic Noctilioni æque convenit. Itaque cl. Geoffroyum consensum est hoc genus serie naturali apte inter illa collocasse. Attamen labii superioris plicis transversis, setisque longis quæ pedes posteriores ultra ungues obtegunt, alis angustis et præcipue dentium structura distinguitur.

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Nyctinomus fusco-nigricans, membrana antipedum longissimorum angustata, cauda gracili ultra medium libera, membrana interfemorali margine plicata fibris muscularibus rarioribus instructa.

*Lowo-churut* of the Javanese.

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## NYCTINOMUS TENUIS.

THE characters of this singular genus among the Vespertilionidæ, were first defined by M. Geoffroy, in the Memoirs of Natural History, which form part of the description of Egypt, being the collection of observations which were made in that country during the Expedition of the French army. In proposing Nyctinomus as a genus, M. Geoffroy details the distinguishing characters in a copious manner, but with his usual perspicuity and elegance. In describing a new species from the Island of Java, it has appeared useful to me, to premise the substance of M. Geoffroy's observations, founded on a consideration of all the species previously known.

M. Geoffroy commences by stating that no combination of characters departs farther from the common type of the Mammalia. The Nyctinomi, he proceeds, have the flat nose and hanging lip of the mastiff, but in an excessive degree. The head appears as if crushed under the weight, and is in a great measure concealed by the amplitude of the ears. These are not simply vestibules to the auditory tube; but they meet each other on the crown of the head, and, extending over the forehead, are prolonged to the region of the intermaxillary bone, and by this arrangement they cover the cranium entirely. By their excessive development, and by means of a fold of the inferior lobe, they afford a peculiar protection to the eye: they apply themselves over this organ, and thus answer the purpose of a second eyelid. To keep the ears elevated, and to cause them, in one point of view, to constitute a concha before the meatus auditorius, and in another to afford to the eyes their proper axis of vision, requires the contraction of all the integuments of the head. The entrance of the ear is provided with that enlargement of the tragus which is peculiar to the Vespertilionidæ, and which is termed by the French naturalists *oreillon*, and by Illiger, the *operculum*. The cerebral case is broad and depressed, and the flatness of the head is not merely an appearance produced by the disposition of the ears, but it is real. The skull is abruptly truncated behind, and the foramen occipitale is remarkable on account of its excessive size. The nostrils would appear extremely simple, were it not on account of the upper lips, which are cleft, and passing backward, lose themselves on the cartilages of the nose, which have the form of a muff. The upper lips are wrinkled with from five to eight transverse folds on each side; and they are rendered still more rugose by means of warts dispersed about them and about the ears. The olfactory openings are lateral and distant, they are at the same time circular, and in consequence of the thickness of the cartilage, they do not appear to possess the capacity of alternately opening and shutting themselves. This is, notwithstanding, the case with most of the other Vespertilionidæ.

M. Geoffroy proceeds to detail a remarkable peculiarity in this genus, by means

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of which the lengthened nasal tubes are bent and pressed to such a degree, that the communication from without, between the nasal fossæ, is suspended. The transparent membrane of the anterior extremities is as in the genus *Noctilio*, which the *Nyctinomi* also resemble by the hare-lip. The hind feet are covered with hair, of such length as to extend beyond the claws. It is remarkable that this circumstance should be placed necessarily in the number of the generic characters of this small group: it is observed among the *Nyctinomi* alone, and it is found in all of them. The tail presents a form which is as yet new: it is almost as long as in the genus *Vespertilio*, but it has a portion only enveloped in the interfemoral membrane. This membrane is smaller than in the last-mentioned genus, but it is thicker, and supported, or rather drawn inward, by strong muscular fibres. It forms a sack by means of natural folds, in consequence of the membrane of the wings passing over the carpus, to unite itself without interruption to the interfemoral membrane.

Mr. Geoffroy enumerates three species of *Nyctinomi*: the first was discovered by himself in Egypt; the second is described by Dr. Buchanan (Hamilton) in the Vth Volume of the Transactions of the Linnean Society, with the name of *Vespertilio plicatus*; the third was found by Commerson in Mauritius, and was described from his materials by Herman, in his *Observationes Zoologicæ*, page 19, with the name of *Vespertilio acetabulosus*. The first is named by M. Geoffroy, *Nyctinome d'Egypte*; the second, *Nyctinome du Bengal*; and the third *Nyctinome de Port-Louis*.

A fourth species of this genus, the *Nyctinomus tenuis*, was discovered by me in Java; and in the following description, the characters which it has in common with the other *Nyctinomi*, and the peculiarities which characterize it as a species, will be detailed. The ears are of excessive size, and in a great measure conceal the head: their form is irregularly oblong, and they are surrounded by a membranaceous margin, united on the crown of the head, from which they stretch forward so as completely to cover the forehead. At the lower extremity of the auricle a rounded obtuse lobe, formed as in several other genera of this order, by the enlargement of the tragus, covers the meatus auditorius. The skull is considerably compressed. The eyes are extremely minute, almost concealed from view, and covered by the lower fold of the membranaceous border of the ear. The upper lip is very fleshy, marked with seven or eight large transverse folds, and passes forward to unite itself with the nose, which is large, surrounded by a delicately crenated margin, and deeply emarginate at the extremity. The nostrils are circular, obscure, and placed at the extremity of the nose. The lips and lateral parts of the face are



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extremely rough, being covered with numerous minute warty points, which are individually terminated by a short stiff bristle.

Of the teeth it is necessary to give a detailed description ; their number is, in the

*Upper Jaw*, 2 front teeth, 2 canine teeth, 10 grinders ; in the

*Lower Jaw*, 4 ditto 2 ditto 10 ditto.

In the upper jaw the front teeth are large, erect, contiguous, very obsoletely four-sided, slightly convex anteriorly, and concave posteriorly, broad at the base, tapering towards the point, the side adjoining the neighbouring front tooth, straight ; that directed to the canine tooth, oblique. The canine teeth are greatly lengthened, slightly bent outward, triangular, with an obscure groove on each side, having the interior edge sharp and cutting, and the base surrounded by a low margin. Of the grinders, the first is very minute, simple, acute, margined at the base, and scarcely projecting beyond the gums. The second, third, fourth, and fifth have a very singular structure : they consist of an elevated exterior margin and a very low interior ridge, between which the crown is very boldly excavated. In the second grinder the exterior margin presents one sharp point, projecting far beyond the other teeth, and passing posteriorly to a very obtuse heel, pressed against the neighbouring tooth ; the interior ridge consists of a single attenuated point. The third and fourth grinders are very large, and agree precisely in their structure. The elevated exterior margin is double ; each part consists of three distinct points disposed in a triangle, of which two are exterior and equal, and a third somewhat more projecting, interior ; the lower ridge is emarginate interiorly, and supports two sharp points, of which the anterior is largest ; very bold grooves separate these from the exterior margin. The fifth tooth has, on the whole, the same structure with the third and fourth, but it is smaller, somewhat compressed, and the posterior portion is oblique, and obscurely defined. In the lower jaw, the front teeth are very small, oblique, deeply emarginate, with obtusely rounded points ; the intermediate tooth being largest, and having the interior point somewhat lengthened. The canine teeth are long, conical, margined, and greatly enlarged at the base, from which rises an obliquely diverging point directed to the opposite tooth, and forcing the front teeth forward, far from their natural situation. The grinders are compressed, and fitted to the bold excavations of the corresponding teeth in the upper jaw. The first and second are conical, simple, and margined at the base ; the point of the second is somewhat elongated. The third, fourth, and fifth are similarly constructed ; each consists of five points, nearly equal in length and dimensions, three of which are anterior, and disposed in a triangle, and two posterior and opposite. The third tooth is somewhat larger than the others, and deviates laterally from the regular series, and the posterior portion of the last grinder tends obliquely outward.



## NYCTINOMUS TENUIS.

The neck is of moderate length, and robust; and the body is broader at the thorax, and gradually attenuated towards the posterior extremities. It is densely covered with a very delicate fur, which also forms a regular border along the sides, from the shoulders to the vent. The breasts and sexual organs are completely hid from view by the close hairy covering. The expansion of the wings is comparatively greater than in the other Vespertilionidæ. The bones of the arms, and the phalanges being greatly lengthened and very slender, the form of the wings is consequently narrow, oblong, and sharp towards the extremity. This indeed is the general character of the Nyctinomi; but it exists in a greater degree than in the species from Egypt and Bengal, and from this character the specific name is derived. The *Nyctinomus tenuis* is also peculiarly distinguished by the narrowness of the membrane of the wings near the body, opposite to the junction of the arm and fore-arm, from another Javanese species contained in our collections, which I have denominated *Nyctinomus dilatatus*, the characters of which I shall concisely define at the end of this article.

The lower extremity of the os humeri is provided at its articulation, with a cartilaginous appendage of an irregular form, from which a very delicate tendon passes, parallel to the arm, towards the shoulder. The thumb, comparatively with other Nyctinomi, is long, and provided as usual with several bones for its support; the claw is very minute. The index has three phalanges, of which the two exterior are scarcely distinguishable by the naked eye. The middle finger has four, and each of the others three phalanges: the extreme ones are very slender and delicate. The membrane is delicate, transparent, and dotted on each side of the body towards the arms, exhibiting a character which exists in a certain degree perhaps in all Nyctinomi, and which has suggested the name of acetabulosus for Commerson's species; it passes over the carpus to unite itself with the interfemoral membrane. The latter is considerably tapering in the middle; having several deep folds near the posterior border, and being provided with several bundles of muscular fibres stretching transversely over it.

The tail is long, slender, and extremely delicate at the extremity; of about nine cylindrical vertebræ which compose it, three only are enveloped in the membrane: more than one half of this organ is thus detached. The feet are provided with five toes of nearly equal length, each of which has a strongly compressed and sharp claw: numerous strong bristly hairs are scattered on the feet, spreading irregularly in all directions.

The colour of the transparent membrane of the wings is sooty black, with a slight tint of brown: it is more intense in the ears, the nose, the tail, and the inter-

## NYCTINOMUS TENUIS.

femoral membrane. The body is deep brown, inclining to sooty black; intense above, and grayish underneath. The fur is extremely soft and delicate, closely arranged, and of uniform length throughout.

### DIMENSIONS.

|                                                                                                                    | Inches. | Lines. |
|--------------------------------------------------------------------------------------------------------------------|---------|--------|
| Length of the body and head, from the nose to the root of the tail....                                             | 2       | 5      |
| ..... the tail .....                                                                                               | 1       | 4      |
| Expansion of the wings.....                                                                                        | 12      | 6      |
| Length of the arm and fore-arm .....                                                                               | 2       | 6      |
| ..... the phalanges of the middle finger .....                                                                     | 3       | 3      |
| ..... the bones supporting the thumb .....                                                                         | 0       | 3½     |
| ..... the posterior extremities .....                                                                              | 1       | 1      |
| Breadth of the membrane of the wings at the narrowest part, opposite to the junction of the arm and fore-arm ..... | 1       | 0      |
| Greatest expansion of the ears on the summit of the head .....                                                     | 0       | 9      |

The general form and the organization of the Nyctinomi are in perfect correspondence with their habits and mode of life. Of all the various Vespertilionidæ which I have examined, these have the greatest expansion of wing; a property which, united to a tapering body, terminated by a long and gradually attenuated tail, enables them, perhaps with more facility than other animals of this order, to dart through the air in rapid flights, and abruptly to change their direction, in the pursuit of minute objects. The Nyctinomi have also a system of dentition, which among all the Vespertilionidæ deviates farthest from that of the Pteropi. In the latter, which feed on fruits and vegetables, the grinders have an almost even and regular crown, divided by one simple longitudinal furrow; in the former, it is complicated to such a degree, that it is difficult, by words, to describe it distinctly. Great care has therefore been taken, in the Plate which illustrates the generic character of Nyctinomus, to exhibit an accurate view of the various points, grooves, and processes of the grinders. To this I therefore refer in illustration of their description. The canine teeth are remarkable in both jaws: in the upper, they present interiorly a very sharp cutting edge; in the lower jaw, they are of uncommon size, greatly distended at the base, and provided with a strong, obliquely diverging process, resembling a thorn, which forces the front teeth in an oblique direction forward. This peculiar structure serves to prevent the escape, and to secure in the interior part of the mouth, the minute insects which are seized in the rapid movements of the Nyctinomi, until they can be conveyed to the back part of the mouth, where the grinders furnish a most effectual apparatus for their immediate destruction.



## NYCTINOMUS TENUIS.

The Nyctinomi, as their name denotes, feed at night. During my residence on the hills of Prowoto, which have already several times been mentioned in these Researches, their pursuit afforded me an occasional amusement. Although they are also found in other parts of Java, they are peculiarly abundant on these hills, which are covered with a luxuriant vegetation, and afford a plentiful supply of their favourite food. They appeared after sunset, while the light was still sufficient for the purpose of distinguishing objects clearly. Observing them almost uniformly, and in quick succession to direct their flight along the hedge, which surrounded a village in which I had my abode, I watched them in this situation, and readily caught them with a large net, which was used in the pursuit of Lepidopterous Insects. By this means I obtained them in great numbers, and selected those that were required for my collections.

I shall conclude this article with a few concise comparative remarks on the various species of Nyctinomus hitherto discovered, and with an enumeration of their specific characters. The Nyctinomus tenuis exhibits very strikingly the characters which afford to the Nyctinomi generally a very peculiar physiognomy; but the narrowness of its wings, and the slenderness of its tail, distinguish it clearly from the other species. For a comparison with the Nyctinomus Egyptiacus, the copious description of M. Geoffroy, accompanied by an accurate and beautiful figure, in the "Description de l'Egypte," afford the most ample materials. From these it appears, that the ears in the Egyptian species spread more in a lateral direction, and that the interfemoral membrane is deprived of muscular fibres. It has likewise a very different colour, being reddish brown above, and brown underneath. Further, I have not observed in M. Geoffroy's figure, so distinctly as occurs in our species, the short stiff bristles which are scattered profusely on the sides of the face, and the dots in the membrane of the wings, on each side of the body. By possessing these, the Nyctinomus tenuis exhibits a great resemblance to Commerson's species, the *Nyctinome de Port-Louis*; but the latter is considerably smaller; the membrane of the body is described as "*nuda ad sternum*," (Hermann's Obs. Zool. p. 19,) and the interfemoral membrane envelopes two-thirds of the tail. The Nyctinomus of Bengal agrees with our species in possessing the transverse muscular fibres of the interfemoral membrane; but it is distinguished by a more robust habit, by a thick, round, fleshy tail, and by a very short thumb.

Having above mentioned a second species of Nyctinomus from Java, for which I have proposed the name of *dilatatus*, I shall now add the distinguishing characters, and subjoin those of the other species in succession.



## NYCTINOMUS TENUIS.

### NYCTINOMUS DILATATUS, *Nobis*.

N. fusco-nigricans subtus dilutior, membrana ad hypochondria dilatata, cauda gracili ad medium adnata, membrana interfemorali fibris muscularibus rarioribus instructa.

### NYCTINOMUS EGYPTIACUS, *Geoffroy*.

N. corpore supra rufo subtus fusco, cauda gracili, membrana interfemorali caudam usque ad medium complectente fibris muscularibus nullis instructa. *Geoffr. Descr. d'Egypte, Hist. Nat. Mem. tom. 2, pag. 128, Pl. II. Desm. Encyclop. Method. Mammalog. pag. 116.*

### NYCTINOMUS MAURITIANUS.

N. fusco-nigricans, cauda ultra medium membrana interfemorali adnata. *Geoffr. Descr. d'Egypte, Hist. Nat. Mem. tom. 2, pag. 130. Desm. Encyclop. Method. Mammalog. pag. 117. Vespertilio acetabulosus. Caudatus, fusco-niger, pilis ad extremos plantarum digitos longissimis, membrana acetabulosa nuda ad sternum. Commers. Mscr. N. 51. Hermann's Observationes Zoologicæ, p. 19.*

### NYCTINOMUS BENGALENSIS, *Geoffroy*.

N. fuliginosus, corpore cinerescente subtus pallidiore, cauda incrassata, membrana interfemorali fibris muscularibus numerosis instructa usque ad medium adnata. *Geoffr. Descr. d'Egypte, Hist. Nat. Mem. tom. 2, pag. 130. Desm. Encyclop. Method. Mammal. pag. 116.*

### NYCTINOMUS TENUIS, *Nobis*.

N. fusco-nigricans, membrana antipedum longissimorum angustata, cauda gracili ultra medium libera, membrana interfemorali margine plicata fibris muscularibus rarioribus instructa.









RHINOLOPHUS LARVATUS.

Three Lines

Drawn & Engraved by W. Taylor.

## RHINOLOPHUS LARVATUS.



ORD. III<sup>me</sup> CARNASSIERS, *Cuvier*. 1<sup>re</sup> Famille. Les Cheiroptères.

ORD. I. PRIMATES, *Linn.* Syst.

ORD. XI. VOLITANTIA, *Illiger*. Fam. 32. Chiroptera.

RHINOLOPHUS, *Geoffr. Cuv. Illig. Desm.*

VESPERTILIO, *Linn. Erxleb. &c.*

CHARACTER ESSENTIALIS.—*Dentes primores* supra duo, ossi intermaxillari mobili inserti, infra quatuor breves, trifidi: *molares* supra exterius margine cuspidato, interius gradu obliquo abbreviato, superficie plano. *Prosthema* maximum, membranaceum, complicatum. *Auriculæ* maximæ sine operculo. *Mammæ* duæ pectorales lactiferæ; papillæ etiam duæ, absque glandulis lactiferis in pubis regione dispositæ, approximatae; (*pelvi tendentes*. Kuhl.)

CHARACTER NATURALIS. *Dentes primores* supra duo, parvi, breves, approximati, paralleli seu convergentes, basi cylindricei, apice compressi dilatati, scalpro integro seu emarginato, ossi intermaxillari cartilagineo, mobili, lamellis duabus parallelis efformato, injuncti; infra quatuor, breves, compressi, approximati, trifidi, exterioribus sublongioribus. *Laniarii* elongati, supra conici, compressi, erecti, subarcuati, gradu interiore dilatato, instructi; infra conici, erecti gradu basilari antice adscendente carinato, postice oblique excurrente, cincti. *Molares* supra utrinsecus quinque; primus minimus obscurus, dentium serie interne omnino occultatus; reliqui complicati, margine exteriori elevato, gradu interiore abbreviato; secundus angustior, acie anteriore elongata, tertius et quartus consimiles, margine exteriori bipartito, ex columnis duabus triquetris tricuspидatis confluentibus efformati, interne gradu angulato obliquo, facie rhomboidea, instructi; quintus minor compressiusculus postice obliquatus. Infra utrinsecus quinque, compressi, superioribus angustiores; primus et secundus unicuspidati, basi margine carinato cincti, primus acie brevi rotundata, secundus acutus elongatus, tertius, quartus et quintus consimiles, serie regulari dispositi, coronide columnis duabus triquetris confluentibus efformata, quinquecuspidata, cuspidum duorum exteriorum anteriore elongata, quintus parte posteriore angustata obliqua.

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*Caput* oblongum, magnum, rostro obtuso terminatum. *Nasus* prosthemate maximo, membranaceo, complicato, figura variis speciebus diversissima; *nares* circulares seu ovals, infundibuliformes, plica membranæ interioris cinctæ. *Labra* dilatata; fibris muscularibus in omnem faciem distributis. *Auriculæ* maximæ, acuminatæ, erectæ vel patentēs, absque operculo, basi simplices vel involutæ, nonnunquam profunde emarginatæ, lobulo accessorio instructæ. *Oculi* mediocres, membrana prosthematis superiore subapproximati.

*Corpus* patagio digitali, lumbari et anali, membranaceis denudatis cinctum. Patagium anale integrum. *Cauda* mediocris, patagio anali innata et ad ejus marginem pertingens. *Mammæ* apertæ duæ pectorales lactiferæ; papillæ etiam duæ, absque glandulis lactiferis in pubis regione dispositæ, approximatae; (*pelvi tendentes*.)

*Pedes* pentadactyli. *Antipedes* chiropteri, hallucē distincto, unguiculato, digitis reliquis elongatis, inermibus; indice phalange minimo aut nullo. *Scelides* ambulatoriæ. *Ungues* falculares, digitorum elongatorum antipedis nulli.

AFFINITAS.—Hoc genus indice minuto cartilagineo phalange unico instructo cum secunda tribu Vespertilionum insectivororum omnino convenit, ac nasi prosthematis structura complicata generi Megadermati proximam affinitatem præbet: tamen auriculæ simplices operculo destitutæ et verrucæ elongatæ in pubis regione dispositæ, quæ ad spectu mammis similes sunt, Rhinolophum ab aliis hujus familiæ generibus longe dissociunt.

\*\*\* *Membrana superiore prosthematis transversa porrecta.*

Rhinolophus supra ex fusco fulvescens postice saturatior subtus fulvus nitore canescente, cauda pedibus brevior, auriculis magnis acutis erectis approximatis basi latissimis simplicibus.

*Lowo-sumbo*, of the Javanese.

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TO the description of the subject which has been selected for the present article, I have proposed to premise a few general observations on the genus, and to exhibit, in a connected view, the species which have been discovered in the Island



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of Java. The genus *Rhinolophus* is one of the most remarkable among the family of *Vespertilionidæ*. The individuals which compose it, are distinguished, even on a superficial view, by ears of excessive size, broad at the base, erect and acuminate, and by a greatly complicated nasal membrane. But the most striking character, which belongs to it exclusively, is the presence of two papillary tubercles, situated on the os pubis, and exhibiting the external appearance of two breasts. This character, as far as my inquiries extend, is first distinctly noticed by Bechstein. The female, he remarks, has, to appearance, four teats, two on the breast, and two on the region of the pubes; the latter he always found relaxed, as if the young had drawn milk from them by sucking, as well as from the others. Mr. Geoffroy notices this character, with the following remark: "besides the two pectoral breasts, which are the only organs for the secretion of milk in the other *Vespertilionidæ*, the *Rhinolophi* have two others, situated near each other, above the os pubis." He recommends this character to the attention of naturalists, and it doubtless deserves more careful investigation. M. Desmarest, in his character of *Rhinolophus*, describes two pectoral mammæ, and two warts, situated on the pubes (*deux verrues publiennes*), having the appearance of breasts, but being destitute of lactiferous glands. M. Kuhl's observations on this subject shew, that during the first year, these lower teats are altogether wanting, that they are minute in the female of two years, and that only in the third year they acquire their full size. It appears to Mr. K. that, although connected with the propagation of the species, they are not breasts, as he never discovered lactiferous glands near them. They are connected with the cavity of the pelvis.

The ears of the *Rhinolophi* resemble those of the *Pteropi*, in the simplicity of their structure. They consist of a large membranaceous lobe, very broad at the base, tapering towards the extremity, but without that enlargement of the tragus, which constitutes the oreillon in the other insectivorous *Vespertilionidæ*, and which affords them the power of rendering themselves deaf at pleasure. This organ is subject, however, to several variations of form, which will be described in enumerating the characters which have been employed in the specific distinctions.

With the simplicity of the ears, the complicated structure of the nose forms a striking contrast; this exists as well in those parts which are concealed by the integuments, as in those which are exposed to view. The external entrance to the olfactory organs consists of several membranes, variously disposed and folded, so as to constitute a funnel, the object of which is, to direct the olfactory particles to the nasal chambers, which occupy an extensive cavity in the anterior part of the skull. The lowest exterior portion of the membranaceous apparatus consists of the apertures

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of the nares, which are confined by a delicate membrane, and have a circular or oval form. These are bounded, at the sides and underneath, by one or by several folds of a membrane, which has some resemblance to a horse-shoe, whence the name of Horse-shoe Bat has, from time immemorial, been applied to the European species of *Rhinolophus*. Above, these nasal apertures are defined by a large membrane, which either rises perpendicularly to a point, in form of a lance, or stretches transversely across the nose, and constitutes a prominent arch or conch. These are the two principal forms which have been observed in the membranaceous apparatus of the *Rhinolophi*, and according to which they may be divided into two sections; but each has again several modifications, which serve to distinguish the species. A cartilaginous partition of the nose projecting forward, which is called the crest, and which may be compared to the bill of a cock, surmounted by its comb, exists in several of those species, in which the superior membrane is lance-shaped and erect. In considering this nasal apparatus, it should be observed, that it is likewise a character in several other genera of this family, but in *Rhinolophus* it has by far the greatest degree of development.

The structure of the lips is very complicated: some of the fibres separate, and are extended to the forehead, leaving a vacancy, which has been compared to a funnel, at the bottom of which the nostrils are situated. The tail is long and entirely enveloped in the interfemoral membrane; its relative proportion to the legs, affords a character which is employed in the discrimination of the species. The fur is generally characterized by a great length and softness; in several of the Javanese species it possesses, on the upper parts of the body and on the breast, an uncommon degree of tenderness and delicacy.

The *Rhinolophi* belong to the second tribe, established by M. G. Cuvier, among the Insectivorous Bats; in this, the phalanx of the index is single, short, or rudimentary, and each of the other fingers has only two phalanges. Of the other genera which are contained in the Museum of the Honourable East India Company, *Megaderma*, *Nycteris*, and *Vespertilio*, also belong to this tribe.

The teeth are very uniform in all the Javanese species of *Rhinolophus*; their structure is clearly exhibited in the natural character; a few slight modifications of the front teeth, above and underneath, will be noticed in the detail of the species.

In describing the *Rhinolophi*, which I have collected in Java, I have to acknowledge my obligation to Mr. Geoffroy, for the general illustration of this genus, which



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is given in his Memoir on the *Rhinolophes*, contained in the XXth Vol. of the *Annales du Museum*, &c. This Essay contains also the most copious list of species which has hitherto been communicated to the public. Mr. Geoffroy enumerates six; these have all been adopted by M. Desmarest, in his "Description des Especes de Mammiferes," in the Encyclopedia. The species enumerated by M. Geoffroy are the following:—1. *Rhinolophus uni-hastatus*; 2. *Rh. bi-hastatus*; 3. *Rh. tridens*; 4. *Rh. speoris*; 5. *Rh. diadema*; 6. *Rh. Commersonii*. To these I have added from Java, 1. *Rhinolophus nobilis*; 2. *Rh. vulgaris*; 3. *Rh. larvatus*; 4. *Rh. insignis*; 5. *Rh. deformis*; 6. *Rh. affinis*; 7. *Rh. minor*. A comparative view of these species will be given in the sequel: their number and peculiar modifications, appearing both in Asiatic and European forms, together with the species of other families of *Vesperilionidæ* which are found in Java, tend to illustrate a very appropriate remark of M. Geoffroy, which I shall give in his own words: "n'est-il pas remarquable que dans chaque région zoologique, quelles qu'en soient les distances, les chauve-souris aient une organisation qui rentre rigoureusement dans une de nos familles, au plutôt que chaque famille ait dans chacune de ces régions un représentant qui lui appartient sans ambiguité come sans partage?" But I may observe here, that as investigation extends, new types are discovered. One of these is exhibited in the *Pteropus rostratus*, of the Third Number of these Researches, which M. Fred. Cuvier has separated from the *Pteropus*, and described as a distinct genus.\*

M. Geoffroy further points out the peculiarities of the *Rhinolophi*, as constituting a genus more strictly limited and circumscribed in its characters than most others. One of the Javanese species in our collection deviates in a small degree from this peculiarity, so that I have been led to suppose that the structure of the head, and the erect disposition of the nasal membrane, as well as the character of the tail, tend to shew that it forms an approach to the genus *Megaderma*. It has been named *deformis*. For the present article I have selected that species, in which the peculiar character of the inguinal protuberances is strikingly apparent.

The Javanese *Rhinolophi* may be generally divided into two sections; the first having the superior lobe of the nasal membrane erect and lanceolate—the second having above a transverse membrane, stretching forward as a small arch. Of the former I have found two species, which, according to M. Geoffroy's ideas, would be the

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\* I should add, at the same time, that in defining this species—the *Pteropus rostratus*—I was not regardless of the *Pteropus minimus* of M. Geoffroy; but as he has placed it in his second division \*\* *des Roussettes à queue*, Ann. du Mus. XV. p. 97, and as it does not agree in colour with our specimens, I decided it to be specifically different.



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representatives of the European Rhinolophi in India. The other section is more strictly Asiatic: three of our species have, in the membrane, the character of the Rhinolophus diadema, with a slight modification; another has already been mentioned as forming an approach to Megaderma; and one of our species has an excavation in the forehead, above the membrane, similar to that of the Rhinolophus speoris of Schneider.

To distinguish clearly the Javanese Rhinolophi from those which are found in other parts of the East Indies, I have taken into consideration, in defining the specific characters, besides the nasal membrane, the ears, the proportional length of the tail and posterior extremities, and the colour of the hairy covering of the body. The ears exhibit the following forms: they are erect, patulous or spreading above, entire, curved or emarginate at the sides; at the base they are simple, or provided on one or on both opposite sides with convolute lobes, which in several species are separated posteriorly by a deep notch, and thus exhibit a distinct inferior lobule. The proportional length of the tail, and of the extremities, affords in several species, a marked distinction. The colour is considerably diversified; it is either golden with a beautiful brown lustre, pure gray with a silvery tint, or pure brown of different shades, passing by insensible gradations to grayish brown and gray. These remarks are sufficient to illustrate the following enumeration of Javanese Rhinolophi.

\* *Prosthematis membrana superiore erecta lanceolata.*

### 1.—RHINOLOPHUS AFFINIS.

RH. supra ex fusco fulvescens subtus fulvus gula pectoreque saturatioribus, cauda pedibus brevior, prosthemate dilatato lacinia superiore erecta lanceolata lateribus infraque membrana lata plicata, septo narium cartilagineo porrecto uncinato, auriculis patulis latere exteriori sinuatis basi lobo accessorio maximo.

Mensura: Rhinolophi vulgaris.

### 2.—RHINOLOPHUS MINOR.

RH. supra plumbeus nitore fulvescente subtus canus, prosthemate dilatato lacinia superiore erecta lanceolata lateribus infraque membrana lata, septo narium cartilagineo porrecto uncinato, cauda pedibus brevior, auriculis magnis erectis latere exteriori emarginatis basi lobo accessorio maximo.

Mensura membranæ antipedum expansorum novem pollicum *Angl.*

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*\*\* Prosthematica membrana superiore transversa porrecta.*

### 3.—RHINOLOPHUS NOBILIS.

RH. supra canescente fuscus subtus dilutior, lateribus colli et abdominis axillis maculaque infra-scapulari albentibus, cauda pedibus longitudine æquali, prosthemate supra membrana transversa porrecta infra acumine elongato, auriculis erectis acutis magnis basi latissimis lobo utrinque subinvoluta.

Mensura membranæ antipedum expansorum  $19\frac{1}{2}$  pollicum.

### 4.—RHINOLOPHUS LARVATUS.

RH. supra ex fusco fulvescens postice saturatior subtus fulvus nitore canescente, cauda pedibus brevior, prosthemate supra membrana transversa porrecta infra acumine brevi, auriculis magnis acutis erectis approximatis basi latissimis simplicibus.

Mensura membranæ antipedum expansorum 14 pollicum.

### 5.—RHINOLOPHUS VULGARIS.

RH. supra fuscus subtus canus concolor, cauda pedibus paululum longiore, prosthemate supra membrana transversa infra simplice, auriculis patulis latere exteriori excisis basi utrinque lobulo involuto villosa.

Mensura membranæ antipedum expansorum  $12\frac{1}{2}$  pollicum.

### 6.—RHINOLOPHUS DEFORMIS.

RH. supra fuscus subtus canescens, calvaria porrecta compressa facie elongata plana, cauda brevi subobscura, prosthemate erecto supra membrana transversa infra simplice, auriculis magnis approximatis erectis latere exteriori parum incisae basi latis lobulo inferiore involuta.

Mensura membranæ antipedum expansorum 12 pollicum.

*\*\*\* Sinu frontali, supra prosthematis membranam transversam.*

### 7.—RHINOLOPHUS INSIGNIS.

RH. supra fuscus subtus canescens concolor, cauda pedibus paululum longiore, sinu frontali elongato inter cutem et calvariam adscendente ore transverso contractili, prosthemate supra membrana transversa concava infra acumine mediocri, auriculis patulis extremitate subrotundis margine exteriori incisae basi utrinque lobulo involuta.

Mensura membranæ antipedum expansorum  $13\frac{1}{2}$  pollicum.

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After this concise view of all the species of *Rhinolophus* which have been found in Java, with those enumerated by M. Geoffroy, I proceed to the description of the *Rhinolophus larvatus*. Our animal affords an excellent illustration of the second section of this genus: the nasal membrane is broad, and all the parts are greatly developed, so as to give the face the appearance of being covered with a mask. In its extent and disposition this membrane agrees with that of the *Rh. Diadema* and *Nobilis*, and it is only by a very careful examination that any difference of structure can be discovered. Our animal is about one-third smaller than the species just mentioned, which, although they agree in size and conformation, differ essentially in their colour. The entire length of the *Rhinolophus larvatus*, from the extremity of the nose to the root of the tail, is three inches, and the expanded wings measure fourteen inches; the tail is one inch long.

The head is short, thick, and abruptly terminated anteriorly, so as to afford a plane surface for the disposition of the exterior portion of the nasal membrane. In its attachment to the neck, it forms nearly a right angle. The neck is swelled, and very short. The length of the animal, without following the curve of the head and face, is no more than two inches and a half. The peculiar attachment of the head is accommodated to the manner in which the *Rhinolophi* suspend themselves, as is ingeniously stated by M. Kuhl, in his account of the German bats.

A very distinguishing character of our animal is the form and disposition of the ears. The base is excessively broad, and altogether without that involution of the lower portion of the lobe which occurs, either on one side only, or on the opposite sides, in the other *Rhinolophi*, and which supplies, in some degree, the place of an oreillon. The anterior margin rises high, forming a curve in its ascent, so that, in the middle, the lobes from the opposite sides nearly approach each other: the extremity is acuminate, having the point tending outward; the posterior margin is very slightly emarginate, and, inclining backward as it approaches the head, continues to form an excessively broad base. The interior of the ear is perfectly naked.

The nasal apparatus is bounded above by a broad membrane, stretching transversely across the nose, and projecting forward in form of a shelf; it has a very slight transversely projecting ridge in the middle; the lateral membrane consists of three parallel folds, of which the exterior is shortest, while the interior constitutes a semicircular envelope, as in the Horse-shoe Bat, which has a short obtusely rounded point in the middle. The nostrils have a vertical direction, and constitute individually a small ovate funnel, surrounded by a narrow membrane. Above these the



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interior of the nose is naked, exhibiting a plane glandular surface, bounded by a ridge parallel to the transverse membrane, having a small groove at its upper margin. A few long, slender bristles are dispersed over the surface of the membranaceous apparatus.

The eyes are of moderate size, and situated somewhat anteriorly, between the upper part of the nasal membrane and the base of the ears. The lips are distended, and closely covered with long bristly hairs, having a direction downward, and constituting a pendulous beard.

The deviations of the teeth, from the description already given in the natural character, are very inconsiderable in the *Rhinolophus larvatus*. The front teeth are somewhat converging and distended on the interior margin, and very obscurely notched. The first grinder is comparatively obscure; the projecting point of the second grinder is long. In the lower jaw the two intermediate front teeth are marked with deep notches, and they are comparatively robust. Of the two simple anterior grinders, the point of the second is acute, and considerably projecting beyond the other teeth. The third, fourth, and fifth grinders form a perfectly regular series, and along the outer ridge, the anterior point projects a little beyond the others.

The body is broad across the thorax, and being gradually attenuated, has an abrupt termination posteriorly, where it forms a broad, obtuse surface, from which the tail proceeds in the middle, and the thighs laterally. The two pectoral mammae have the usual form and disposition; immediately above the union of the ossa pubis, about one-fourth of an inch from the anus, and two lines distant from each other, are situated two cylindrical warts or papillary tubes, above a line in length, regarding the purpose of which, the opinion of the most eminent naturalists is still divided. Among the various Javanese species, these organs are particularly prominent and conspicuous in the *Rhinolophus larvatus*, and a careful and accurate view of them is given on the Plate. They became obvious only in this species, after removing the covering of the body. This consists of very long, close, silky hairs, very soft to the touch, and closely investing the body, both above and underneath. Its greater thickness on the neck and breast forms a peculiarity among the Javanese species, in our animal, and in the *Rhinolophus nobilis*.

The length of the anterior extremities is moderate, and the membrane presents nothing peculiar; the thumb is provided with a sharp claw, and the index is without a phalanx. The form of the interfemoral membrane is regulated by the

### RHINOLOPHUS LARVATUS.

length of the tail, which in our animal is shorter than the legs. The posterior extremities are long and slender, and the claws are strongly curved, and very acute.

The colour of the *Rhinolophus larvatus* above, is deep brown, with a golden lustre; it is more intense posteriorly. The separate hairs have a golden hue at their base, which becomes brown towards the tip; so that, by the accidental undulations, a most beautiful variegation is produced on the covering of the animal. Underneath, the hairs have a lighter golden tint, which becomes grayish towards the extremity, in consequence of which the colour here has a strong tint of gray. The membrane is blackish-brown, with a yellowish gloss, which varies according to its disposition to the light.

The *Rhinolophi*, in Java, agree in their manners and mode of life, with those that are found in other countries. They retire, during the day, into deep recesses and caverns; at night they sally forth in pursuit of insects. The relative number and distribution of species, in Java, remain to be ascertained by future investigations. The *Rhinolophus larvatus*, as far as I have observed, is less abundant than several other species; the *Rhinolophus vulgaris* appears to be most generally distributed.







6 Inches.

**RHINOLOPHUS NOBILIS.**

*From a specimen in the collection of the British Museum.*

## RHINOLOPHUS NOBILIS.



ORD. III<sup>me</sup> CARNASSIERS, *Cuvier*. 1<sup>re</sup> Famille, Les Cheiroptères

ORD. I. PRIMATES, *Linn.* Syst.

ORD. XI. VOLITANTIA, *Illiger*, Fam. 32. Chiroptera.

RHINOLOPHUS, *Geoffr. Cuv. Illig. Desm.*

VESPERTILIO, *Linn. Erxleb. &c.*

CHAR. GEN.—*Dentium formula*; *Primores*  $\frac{2}{4}$ , *Laniarii*  $\frac{1}{1}$ , *Molares*  $\frac{5}{5}$ . *Primores* supra ossi intermaxillari mobili inserti, infra breves trifidi; *molares* supra exterius margine cuspidato, interius gradu obliquo abbreviato, superficie plano. *Prosthema* maximum, membranaceum, complicatum. *Auriculæ* maximæ sine operculo. *Mammæ* duæ pectorales lactiferæ; papillæ etiam duæ, absque glandulis lactiferis, in pubis regione dispositæ, approximatae, pelvi tendentes.



\*\* *Prosthematis membrana superiore transversa porrecta.*

Rhinolophus supra canescente fuscus subtus dilutior, lateribus colli et abdominis axillis maculaque infra-scapulari albescentibus, cauda pedibus longitudine æquali, prosthemate supra membrana transversa porrecta infra acumine elongato, auriculis erectis acutis magnis basi latissimis lobo utrinque subinvolutis.

*Kébbélék*, of the Javanese.



AFTER the general view of the Javanese species of Rhinolophus, which was exhibited in the Sixth Number of this Work, it is my intention to give the figures, and a more detailed description, of several of the most interesting species. For the present Number I have selected the RHINOLOPHUS NOBILIS, the largest in the Honourable Company's Museum. It is equal in size to the Rhinolophus Diadema, which was discovered by MM. Péron and Lesueur in Timor, and it has the same character in the nasal membrane, and a similar habit and proportion of parts; but it differs essentially in colour. Two principal modifications are observed in the Javanese Rhinolophi, as far as regards the external covering: several have the brilliant golden lustre, which, in the opinion of M. Geoffroy Saint Hilaire, becomes more intense

## RHINOLOPHUS NOBILIS.

according as these animals inhabit countries nearer to the Equinoctial Line : others have the more simple and obscure tint of the European species. Of the former an example is afforded by the *Rhinolophus larvatus* and the *Rh. affinis* ; of the latter by the *Rhinolophus nobilis* and the *Rh. minor*. Several of the other Javanese species have an intermediate tint.

The *Rhinolophus nobilis* belongs to the second section of this genus. The nasal apparatus consists of a broad membrane stretching transversely across the nose, in form of a shelf ; the sides are bounded by several parallel folds, and inferiorly it constitutes a semicircular envelop, which has a short, obtusely rounded point in the middle. All the remarks which apply to the genus *Rhinolophus* generally have already been given with detail in the description of the *Rh. larvatus* ; but few observations therefore are required to point out the specific distinctions of our animal. The colour above is pure brown, and underneath brown variegated with gray. The sides of the breast, and of the body underneath, and the marks on the back, above and beneath the scapula, are light gray, inclining to white, with an obscure silvery lustre. The fur is remarkably long and silky, and supplied with a most delicate down at the base, so as to be throughout very soft to the touch. The hairs are uniformly gray at the base ; on the darkest portion of the back, about one half of their length, is dark brown with an almost imperceptible hue inclining to chestnut ; on the upper parts of the neck and head, the basal gray portion exceeds the brown portion near the extremity ; these parts therefore have a lighter tint. Underneath, the hairs are generally more soft and lengthened, and the gray colour predominates. The lowest portion of the breast and abdomen is marked by a broad band covered with hair, gray at the base, and brown at the extremity. The hairs of the axillæ, hypochondriæ, and scapular marks are nearly white. The flying membrane has a deep tint of pure brown, with a slight tawny gloss. In the proportional length of the anterior and posterior extremities, the *Rhinolophus nobilis* agrees with the *Rh. larvatus*. The tail is equal in length to the posterior extremities, exclusive of the toes. The ears are remarkably large, and tending to the sides ; they are acutely terminated at their union with the head ; the margin, anterior and posterior, is involuted, the posterior involution being the largest.

The body of the *Rhinolophus nobilis* is four inches in length ; the expanded membrane measures nineteen inches and an half. Our animal feeds on insects. It is comparatively a rare species : two specimens only are contained in the Honourable Company's Museum, which agree in size, colour, and external characters.







VESPERTILIO TEMMINCKII.

## VESPERTILIO TEMMINCKII.

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ORD. III<sup>me</sup> CARNASSIERS, *Cuvier*, 1<sup>re</sup> Famille, les Cheiroptères.

ORD. I. PRIMATES, *Linn.* Syst.

ORD. XI. VOLITANTIA, *Illiger*. Fam. 32, Chiroptera.

VESPERTILIO, *Linn. Briss. Cuv. Geoff. Illig. &c.*

CHAR. GEN.—*Dentes primores* supra duo solitarii aut quatuor geminati, lacuna intermedia distincti, cylindrici, acuti, vel compressi, emarginati; infra sex valde approximati, apice bifidi rarius trifidi. *Laniarii* distincti longiores conici vel sæpius obsolete trigoni. *Molares* supra utrinsecus quatuor, quinque vel sex infra utrinsecus quinque vel sex, anterioribus sæpius unicuspidibus, posterioribus complicatis multicuspidatis.

*Rostrum* productum. *Nasus* prosthemate nullo. *Auriculæ* magnæ operculatæ.

*Corpus* patagio digitali, lumbari et anali, denudatis cinctum. Patagium anale integrum. *Cauda* patagio anali innata, ad marginem ejus usque protensa, inflexa. *Mammæ* apertæ duæ pectorales.

*Pedes* pentadactyli, antipedes chiropteri, halluce libero unguiculato, digitis elongatis muticis. Scelides ambulatoriæ. *Ungues* falculares, digitorum elongatorum antipedum nulli.

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HAVING in the former Numbers of this Work described and figured various subjects of the Family of Chiroptera, I have proposed in the present to give a connected view of the species collected in Java, which belong to the genus *Vespertilio*, as defined by M. Geoffroy St. Hilaire, with a more detailed account of one of these, which is represented on the Plate annexed to this article. I have dedicated it to my illustrious friend, C. F. Temminck, the Director of the Museum of Natural History of the King of the Netherlands, in Leyden.

The species will be enumerated in the following order:—1. *Vespertilio Temminckii*; 2. *Vespertilio adversus*; 3. *Vespertilio Hardwickii*; 4. *Vespertilio tralatitius*; 5. *Vespertilio imbricatus*; 6. *Vespertilio pictus*.



## VESPERTILIO TEMMINCKII.

### I.—VESPERTILIO TEMMINCKII, *Nob.*

V. capite cuneato supra lateribusque planis, auriculis capite brevioribus oblongis rotundatis margine exteriore parum excisis trago elongato falcato, vellere sericato pilis brevissimis supra fuscis subtus sordide-flavis lateribus capitis corporisque nitore dilute rufescente.

DENTIUM FORMULA:—*Primores*  $\frac{1-1}{6}$ , *Laniarii*  $\frac{1-1}{1-1}$ , *Molares*  $\frac{4-4}{5-5}$ .

UPPER JAW.—Front teeth; one on each side, oblique, closely applied to the canine teeth at the base, which has a slight marginal enlargement; point conical and simple, with a strong inclination inward. Canine teeth of moderate size, erect, with a small, compressed, vertical heel at the base, by which they meet the first grinder. Four carnivorous teeth (carnassières) on each side; the first with a conical projecting point, and an interior dilation at the base; the second and third very large, compound, and having the usual form of the large grinders in this Family; the fourth small, and greatly compressed. LOWER JAW.—Front teeth six, nearly equal in length, less strongly emarginate than in other species. Canine teeth very slightly curved, and tending outward, base having a marginal heel interiorly. First grinder very minute, regularly disposed in the series, compressed at the base, with a short, acute, conical point; second grinder having a somewhat compressed point, projecting slightly beyond the other teeth, and an internal heel at the base, which is closely applied to the third grinder; this, as well as the fourth, is very large; the fifth is, as usual, somewhat compressed posteriorly.

The head is of moderate length, broad between the ears, and very gradually contracted in dimensions towards the nose; it is nearly even above, compressed at the sides, and its vertical dimensions are proportionally great. The muzzle is broad, and abruptly terminated. The nose is slightly emarginate, and the apertures of the nares are directed downwards. The eyes are distinct, and more prominent than is usual in this genus. One of our specimens has an indication of the sebiferous glands, in a semilunar rib, extending across the face before the eyes. The angle of the mouth (*mundwinkel*) is proportionally small, and terminates under the eyes; while in many species of this genus it extends backward to the region of the ears. The lips are not thickened or rugose, but bordered, and nearly concealed by delicate hairs. The ears are somewhat shorter than the head; the auricle is oblong, erect, rounded, obtuse, naked, and slightly indented posteriorly; it is continued into a narrow border,

## VESPERTILIO TEMMINCKII.

which terminates below in a small lobule; a little above this is situated the dilated tragus, (*oreillon*, or *operculum*,) which is linear, erect, somewhat falciform, and shorter than the auricle. Interiorly the ear has several transverse membranaceous folds.

The entire length of the *Vespertilio Temminckii* is four inches and six lines; of this the head occupies about one inch, and the remainder is made up in nearly equal proportions, by the neck and body, and by the tail. The neck is thick, and the body robust, and very gradually attenuated. The tail consists of seven delicate cylindrical vertebræ, supporting a large interfemoral membrane, expanded at the sides by a delicate cartilage. About the middle of this, a small semicircular appendage of the membrane is placed exteriorly. The anterior extremities have an expansion of twelve inches.

A peculiar character is afforded to the *Vespertilio Temminckii* by the shortness of its fur. It is uniformly and thickly covered by very soft, delicate, silky hair, closely applied to the skin: on the upper parts this hair is about a line in length; it is shorter and more delicate on the head and forehead: on the breast and under side of the neck it is somewhat longer, and constitutes, when raised, a soft down; but it more naturally lies close to the skin. The colour of our animal is pure dark brown above, grayish brown, somewhat dusky, underneath, with a rufous tint extending laterally from the nose to the tail. The transparent membranes are brown, with a tawny lustre. The interfemoral membrane is slightly veined in the middle, and plain at the sides.

Of the remaining species I shall at present give the specific character with a very concise notice, reserving for a future opportunity a more detailed description.

## II.—VESPERTILIO ADVERSUS, *Nob.*

V. capite cuneato postice alto, rostro lato, dentibus primoribus maxillæ superioris per paria de laniariis remotis scalpris emarginatis denticulis adverse positis, auriculis erectis obtusis parum postice spectantibus trago lineari erecto, vellere sublanuginoso pilis longis supra fuscis nitore griseo subtus albido-canescens.

DENTITUM FORMULA:—*Primores*  $\frac{2-2}{6}$ , *Laniarii*  $\frac{1-1}{1-1}$ , *Molares*  $\frac{6-6}{6-6}$ .

The upper jaw is broad, and the series of teeth are, comparatively with other species, distant from each other. Front teeth, two on each side, approximated in pairs, and somewhat removed from the canine teeth, erect, compressed, emarginate, with the sides in contrary directions, so that the notches are placed adverse to each other, the interior tooth



## VESPERTILIO TEMMINCKII.

and its notch having the natural position, while the exterior tooth is transversely placed, and the notches meet in form of a cross. Canine teeth long, and somewhat triangular. Grinders, six on each side, of which three are false grinders, and three carnivorous teeth; the latter having the usual structure which occurs in this Family. The first false grinder is conical, small, and simple; the second very minute, concealed and forced inward; the third has a triangular point, projecting slightly beyond the general series. The lower jaw has likewise three false grinders, and three carnivorous teeth on each side, disposed in a perfectly regular series: the first false grinder is conical, simple, and margined at the base; the second very minute, and compressed; the third is equal in length to the series of carnivorous teeth, which have nothing peculiar in their structure.

The head is short, high in a vertical direction between the ears, and abruptly tapering to a broad rostrum; the sides are naked; the forehead oblong, having uniform dimensions from the vertex to the nose, which is broad and obtuse; the nostrils are directed downwards. The ears are as long as the head; the auricle erect, obtuse, slightly inclined backward; the posterior margin terminating in a very small lobule; the tragus erect, linear, obtuse, and half as long as the auricle. The entire length from the nose to the tail is three inches and three lines; of this the tail composes one inch and three lines. The expanded membrane measures ten inches: the interfemoral membrane is irregularly veined, and marked with obscure dots. The fur is very soft, long, and silky; above grayish brown, and underneath whitish; the tips of the hairs on the upper parts have a light grayish tint, and underneath the silky down of the fur is grayish brown.

### III.—VESPERTILIO HARDWICKII, *Nob.*

V. capite calvaria globoso-tumida, rostro brevi depresso, dentibus primoribus interioribus elongatis simplicibus, auriculis latissimis lobo rotundato productis concavis postice carinatis lateribus conniventibus tragus lineari-lanceolatum erectum longum includentibus, vellere lanuginoso mollissimo pilis longissimis basi sericatis supra canescente-fuscis subtus sordide-canis membrana antipedum et interfemorali transverse venosis.

I have named this species in honour of Major General Thomas Hardwicke, who has lately arrived in England with the fruits of his long and successful researches, consisting of a most extensive series of drawings, and of numerous collections of subjects in all branches of Zoology, made with great zeal, and a liberal devotion of his means, during a long residence in various parts of India.

DENTIIUM FORMULA—*Primores*  $\frac{2-2}{6}$ , *Laniarii*  $\frac{1-1}{1-1}$ , *Molares*  $\frac{6-6}{6-6}$ .

Front Teeth, in the upper jaw two on each side, approximate in pairs near the canine teeth; the interior tooth somewhat longer, nearly erect, compressed, entire, and slightly cuneate at the extremity; the exterior tooth small and somewhat oblique. Canine teeth, long, compressed, with a heel interiorly at the base. Three false grinders and three carnivorous teeth on each side: the two first false grinders small, simple, disposed in regular succession; at the third, which has a point projecting beyond the posterior grinders, and a dilatation laterally and interiorly at the base, the series of teeth takes a slight curve outward. The grinders in the lower jaw are disposed in a regular series, having a very slight inclination outward; the three false grinders are simple, compressed, somewhat dilated at the base, and nearly of equal length.



## VESPERTILIO TEMMINCKII.

Ears large, auricle very broad at the base, with the posterior lobe descending, and terminating with a rounded process opposite to the angle of the mouth; the anterior and posterior lobes meet when the ears are in a collapsed state, and constitute a deep fold including a long linear-lanceolate tragus. The rostrum is very short, depressed, and obtuse, and the skull globular, and distended between the ears. The entire length is three inches, of which nearly one half is made up by the tail. The distinguishing character of this species is a very long, delicate, soft silky fur, grayish brown above, and brown, with a tawny tint, underneath. The interfemoral membrane, and the membrane of the anterior extremities near the body and thighs, are marked with regularly parallel transverse veins.

### IV.—VESPERTILIO TRALATITIUS, *Nob.*

V. capite cuneato, calvaria supra rostroque latiusculis, dentibus primoribus superioribus obliquis interiore emarginato, auriculis latis planis obtusis antice posticeque rotundatis trago brevi lineari erecto obtuso, antipedibus subelongatis, vellere molliusculo supra fuliginoso subtus canescente.

*Lowo-manir*, of the Javanese.

DENTITUM FORMULA.—*Primores*  $\frac{2-2}{6}$ , *Laniarii*  $\frac{1-1}{1-1}$ , *Molares*  $\frac{5-5}{6-6}$ .

UPPER JAW.—Front teeth, two on each side; the interior tooth oblique, compressed at the extremity, and notched; the exterior tooth obsoletely angular at the base, attenuated at the point, having the same direction as the interior tooth, to which it is closely applied. Canine teeth long, nearly erect, obsoletely triangular. Two false grinders, and three carnivorous teeth on each side, the first compressed, short, regular in its disposition; the second margined at the base, and compressed at the point which projects beyond the neighbouring grinders. LOWER JAW:—six grinders; the three first with simple points, increasing successively in dimensions. Front teeth somewhat less distinctly emarginate than usual.

Head, cuneate and broad above; skull with a very slight distension posteriorly, a few bristly hairs scattered over the face; ears large, auricle plain, broad, obtuse, rounded anteriorly and posteriorly. Tragus short, linear, erect, obtuse. Wings narrow and of considerable extent; bone of the fore-arm slender. Point of the tail lengthened. Interfemoral membrane slightly dotted. Fur of moderate length, of a sooty black tint above; underneath, sooty, with a grayish cast. Length from the nose to the tail, three inches; of the expanded membrane, ten inches.

This species has much of the habit of European Vespertiliones.

### V.—VESPERTILIO IMBRICATUS, *Nob.*

V. capite rostroque latis brevibus, dentibus primoribus superioribus obliquis compressis emarginatis imbricatis, auriculis latis obtusis trago brevi semilunari subrefracto antice spectante, vellere fusco nitore fulvescente, pilis frontalibus erectis rostrum auriumque basin subtegentibus.

*Lowo-lessér*, of the Javanese.

## VESPERTILIO TEMMINCKII.

DENTIUM FORMULA.—*Primores*  $\frac{2-2}{6}$ , *Laniarii*  $\frac{1-1}{1-1}$ , *Molares*  $\frac{4-4}{5-5}$ .

UPPER JAW.—Front teeth, two on each side, oblique, compressed, emarginate, imbricate, the interior somewhat larger. Grinders, four on each side; they are all carnivorous teeth, the first being somewhat smaller and compressed. LOWER JAW:—Grinders, five on each side, compressed, with points more elevated than usual. Of the two anterior teeth, the first is very minute and simple, and the second, margined at the base. The canine teeth are short, tending slightly outward, with a compressed anterior heel. The intermediate front teeth are subtrifid.

The head is short and broad; the forehead slightly elevated. The nose is broad, and the eyes are concealed by a thick fur, which also partially covers the short rostrum and the base of the ears. The nose is broad, and the eyes are obscure. The ears are as large as the head: the auricles are oblong, obtuse, rounded, and have a slight tendency backward; the tragus is short, semilunar, obtuse, with the extremity pointing forward. The expansion of the wings is proportionally great, and the interfemoral membrane marked with transverse veins. The fur, both above and underneath, is brown, with a fulvous lustre. This species agrees in the length of the body with the *Vespertilio tralatitius*: the expansion of the wings is somewhat less.

## VI.—VESPERTILIO PICTUS, *Pallas Spicil.* III. p. 7.

V. auriculis ovalibus capite brevioribus latioribus quam longis trago subulato, vellere supra rufo aurato subtus flavicante, membrana antipedum juxta digitorum phalanges plagis dilute flavis notata..

*Lowo-kembang*, of the Javanese.

*Vespertilio pictus*, *auctorum*.

*Vespertilion kirivoula*, *Geoff. Ann. du Mus. Vol. VIII. p. 199.*







PTEROPUS JAVANICUS.

*Drawn by W. Daniell.*

*Engraved by W. Taylor.*

# PTEROPUS JAVANICUS.



ORD. III<sup>me</sup> CARNASSIERS, *Cuvier*. 1<sup>re</sup> Famille. Les Cheiroptères.

ORD. I. PRIMATES, *Linn. Syst.*

ORD. XI. VOLITANTIA, *Illiger*. Fam. 32, Chiroptera.

PTEROPUS, *Briss. Erxleb. Cuv. Geoff. Illig.*

VESPERTILIO, *Linn. Gmel. Bodd.*

SPECTRUM, *Lacep.*

CHAR. GEN.—*Dentium formula*; *Primores*  $\frac{4}{4}$ , *Laniarii*  $\frac{1-1}{1-1}$ , *Molares*  $\frac{5-5}{6-6}$ . *Laniarii*

distincti, primoribus longiores, conici. *Molares* obducti, coronide in medio sulco exarata margine utrinque carina parallela tritoria prædita.

*Rostrum* acutum. *Nasus* prosthemate nullo. *Auriculæ* mediocres oblongæ.

*Corpus* patagio digitali, lumbari, et anali, denudatis cinctum. Patagium anale excisum. *Cauda* aut brevis aut nulla. *Mammæ* apertæ duæ pectorales.

*Pedes* pentadactyli, antici chiropteri, halluce et digito primo unguiculatis, reliquis digitis inermibus; postici ambulatorii. *Ungues*: falculæ acutæ, antipedum digitis elongatis, tribus interioribus exungiculatis.



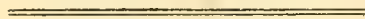
## \* ECAUDATI.

*Pteropus niger*, collo supra rufo-ochraceo, dorso pilis albis nigrisque commistis, rostro mediocri.

*Kalong*, of the Javanese.

*Pteropus edulis*, *Geoffr. Mém. sur les roussettes. Ann. Mus. Tom. XV. p. 90. Note. MS. de M. Leschenault.*

*Pteropus javanicus*, *Encyclop. Method. Mammalogie, p. 109. Par M. A. G. Desmarest, 1820.*



IN the examination of the *Pteropus rostratus*, no difficulty occurred in determining the species; the characters were strongly marked, and presented no variation in the numerous specimens contained in the collections of the Honourable East India Company. But the minuteness of the subject did not afford the means

## PTEROPUS JAVANICUS.

of illustrating the generic character in a satisfactory manner. For this purpose, the species selected for the present article is more particularly calculated: it is the largest hitherto discovered, and all the characters exist in a complete state of development. It may, however, be proper for me to state in this place, that the following details are not given as an original illustration of this genus; this has already been afforded to the scientific Public, both by M. Geoffroy-Saint-Hilaire, and by M. Fréd. Cuvier. I mention particularly the details of the latter, contained in his "Memoires sur de nouveaux caractères pour les genres des Mammifères," published in the *Annales du Museum*, &c., to which Memoirs I have on various subjects in the course of this Work, already referred with acknowledgment. But entertaining the desire to supply to the animals successively described, all the illustration which the materials in the Museum at the India House afford, I trust the present discussion on this genus will not be unacceptable to the patrons of these Researches.

On the Plate of Illustrations I have represented, with all possible accuracy, the skull and the teeth of the *Pteropus javanicus*, of natural size; but before I proceed to the description of them in detail, I shall enumerate the essential characters of this genus, as given by M. Geoffroy and the Baron Cuvier. By the former they are comprised in the following terms:—crown of the grinders large, and terminated by two ridges: second finger of the hand provided with an unguiculate phalanx. M. Cuvier concisely expresses them thus:—the grinders have two longitudinal and parallel projections, separated by a groove, which are worn by detrition. As the celebrated Illiger has not included this peculiarity in his generic description, I have added it to the citation of this genus from his prodromus, placed at the head of this article. In the Plate of Illustrations, Figure Q represents the skull of the *Pteropus javanicus*. The form of the skull, its relative proportions, and the limits of the intermaxillary bone are distinctly exhibited. This species affords a sample of the genus in its intermediate state, between the extremes of elongation and brevity of the rostrum: the latter here constitutes about one third of the length of the skull; in other species it bears a much smaller proportion; in the *Pteropus rostratus* it is comparatively much longer. The longitudinal crest along the highest part of the skull is distinctly exhibited: an accurate examination of the skulls of the individuals of this genus may assist in future in affording distinctions, where other characters are insufficient.

The teeth are 34 in number: namely,

IN THE UPPER JAW—4 front teeth, 2 canine teeth, and 10 grinders.

IN THE LOWER JAW—4 ditto 2 ditto 12 ditto

In the upper jaw the front teeth are semicircularly arranged, at equal distances; they are cylindrical, and present a transverse edge by the detrition of their inner



## PTEROPUS JAVANICUS.

surface. The canine teeth are long, erect, grooved, and provided at the base, internally, with a semicircular ridge. Of the grinders the first is in most cases only rudimentary; the second, third, and fourth have a similar construction; their surface is greatly compressed. In a lateral point of view, they present anteriorly an elevated point, declining to the back part of the tooth, where it constitutes an obsolete notch: the anterior elevation is most prominent in the second, and gradually decreases to the fourth. Longitudinally their surface is individually divided by a groove, leaving on each side an elevated triturating ridge, which has been described above as constituting the essential character of this genus. The fifth grinder is minute, nearly triangular, with an even triturating surface.

In the lower jaw, the front teeth have the same arrangement as in the upper; but the exterior teeth have double the size and thickness of the intermediate teeth. The canine teeth are shorter than these teeth in the upper jaw, and they are less deeply grooved. The first grinder is minute and cylindrical, having a single excavation in the middle of its circular surface. The second, third, fourth, and fifth grinders have the same construction as the second, third, and fourth in the upper jaw, and the sixth grinder is small, cylindrical, and even on the surface.

In attempting to define the specific character of the *Pteropus javanicus* from a review of the specimens which I brought from Java, I met with perplexities which had not occurred in describing the *Pteropus rostratus*. These specimens are so diversified in their external marks, that they appeared to belong to distinct species; but after the most careful examination, I came to the conclusion, that they indicate two strongly marked varieties. One of these corresponds to the specific character placed at the head of this article: the second requires a separate description; and I shall only state at present, that the principal distinction consists in a collar of a lighter brown, inclining to chesnut, and extending entirely around the neck; in a mixture of brown hairs with the black hairs, both on the back and on the abdomen; and in a more regularly defined line across the back, separating the brown hairs from the general black colour of the animal. Of the first variety there are four, and of the second five specimens in the Museum. They are sufficiently diversified to shew distinctly that the differences are not the effect of age; and of each variety there are young and old specimens. The longitudinal ridge on the summit of the cranium affords no distinction, and a careful comparison of the other parts of the skull appears to shew that they belong to the same species. The difficulty of discriminating the species of this strongly marked genus, in consequence of the uniformity of the external marks necessarily employed in defining them, is strongly pointed out by M. Geoffroy: it has occurred to me, not only in examining the *Pteropus javanicus*, but also in the review of the individuals of another species, provided with short

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tails and margined ears. In the latter, I have found in the specimens from Java, indications of a new species; and my inquiries have convinced me that many other species still remain to be added to this genus. One of these, which is a native of Bengal, was lately communicated to me by Joseph Sabine, Esq.; it is a large animal, and belongs to the first subdivision: it agrees with most of the species already known, in having a brown collar; but it possesses distinct characters in the peculiar distribution of this collar, and in the shortness and form of its muzzle.

The *Pteropus javanicus* is the largest species of the genus hitherto discovered: in adult subjects, the extent of the expanded wings is full five feet, and the length of the body one foot. In the specimen which I have placed before me in this description, the extent of the wings was five feet and two inches. The smallest specimen in the Museum has an expansion of three feet and ten inches across the wings: all the other specimens measure nearly five feet. The length of the arm and forearm together, from the union with the body to the origin of the phalanges, is fourteen inches; the latter are distributed as in other species of *Pteropus*. The naked thumb projecting beyond the membrane, measures two inches; and the claw, which is strong and sharp, has an extent of nearly one inch along its curvature. On the index the claw is minute, and by the particular inflexion of the phalanges, which was first pointed out by M. Geoffroy, and which is carefully represented on the Plate, it obtains a direction opposed to the plane of the membrane. The length of the posterior extremities is eight inches and an half. The toes, which are slender, compressed, and distinct, agree in size, with the exception of the exterior toe, which is almost imperceptibly smaller; they are disposed on the same plane. The claws have nearly the same size and extent of curvature as the claw of the thumb. The interfemoral membrane is regularly cut out in a circular manner, and forms a border along the inner side of the posterior extremities, about an inch and an half in breadth.

The head, as in other species of *Pteropus*, is oblong, and the muzzle comparatively of moderate length: it is very gradually attenuated, and measures less than one third of the entire length of the head. The nose is short, somewhat compressed at the sides, and deeply emarginated anteriorly: in dried specimens, this organ is somewhat contracted within the volume of the bony support of the rostrum. The nostrils are round anteriorly, and pass backward by a curve, resembling part of a volute. The ears are simple, long, narrow, and acuminate. The eyes, as in other species of this genus, are large and prominent, and the irides dark. The gape of the mouth terminates under the anterior canthus of the eye, and, in correspondence with the length of the muzzle, admits of considerable expansion. The nose projects but slightly beyond the jaw, and the lips are narrow, and form a neatly defined inclosure of the mouth. No vibrissæ exist, but a few lengthened, bristly hairs are



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scattered about the lips, nose, and eyes. On the upper part of the head, the crest of the skull shews itself as a longitudinal ridge, which is more prominent in adult individuals, and on the whole is more apparent in that variety of the *Pteropus javanensis* to which our animal belongs, than in the other. The general form of the body presents nothing peculiar: the anterior part of the breast in the female is as thickly covered with hairs as every other part, and the mammæ are situated near the axillæ. The organs of generation in the male are greatly developed.

The colour of the flying-membrane is dark brown, inclining to black, with a slight tint of rufous. The general colour of the body and head is black, and of the neck and adjoining parts above, smoky brown; but both the extent and intensity of these colours are subject to variations. In the specimen which was figured to illustrate this article, the hairs which cover the head are short, black, and scantily interspersed with hairs of a grayish hue. On the back, long black and white hairs are mixed in nearly equal proportion, so as to afford a gray appearance to these parts; they are closely applied to the skin. On the rump, hairs of a similar colour are long and frizzled. The covering of the under parts exhibits several modifications in different specimens. In some, the hairs are smooth, and purely black; in others, they have a sooty colour, and numerous tawny hairs are intermixed.

The upper and lateral parts of the neck, and the adjoining parts of the back, between the shoulders, afford a principal distinction in the varieties of this species. In many individuals, the brown or rufous hairs form a complete collar round the neck, though the colour is always more intense above. The breadth of this collar varies considerably; in some cases it extends from the middle of the head to beyond the shoulders; in others it is confined to the neck and the back part of the head. The tint likewise varies from rufous to blackish brown, but in all cases it has a smoky hue. In young subjects the hairs are long, soft to the touch, and glossy; in old subjects they become crisp and rough.

The *Pteropus javanicus* is extremely abundant in the lower parts of Java, and uniformly lives in society. The more elevated districts are not visited by it. Numerous individuals select a large tree for their resort, and suspending themselves with the claws of their posterior extremities to the naked branches, often in companies of several hundreds, afford to a stranger a very singular spectacle. A species of *Ficus*, in habit resembling the *Ficus religiosa* of India, which is often found near the villages of the natives, affords them a very favourite retreat, and the extended branches of one of these are sometimes covered by them. They pass the greater portion of the day in sleep, hanging motionless: ranged in succession, with the head downwards, the membrane contracted about the body, and often in close contact,



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they have little resemblance to living beings, and by a person not accustomed to their economy, are readily mistaken for a part of the tree, or for a fruit of uncommon size suspended from its branches. In general these societies preserve a perfect silence during the day; but if they are disturbed, or if a contention arises among them, they emit sharp piercing shrieks, and their awkward attempts to extricate themselves, when oppressed by the light of the sun, exhibit a ludicrous spectacle. In consequence of the sharpness of their claws, their attachment is so strong, that they cannot readily leave their hold, without the assistance of the expanded membrane; and if suddenly killed in the natural attitude during the day, they continue suspended after death. It is necessary therefore to oblige them to take wing by alarming them, if it be desired to obtain them during the day. Soon after sunset they gradually quit their hold, and pursue their nocturnal flights in quest of food. They direct their course, by an unerring instinct, to the forests, villages, and plantations, occasioning incalculable mischief, attacking and devouring indiscriminately every kind of fruit, from the abundant and useful Cacao-nut, which surrounds every dwelling of the meanest peasantry, to the rare and most delicate productions, which are cultivated with care by Princes and Chiefs of distinction. By the latter, as well as by the European colonists, various methods are employed to protect the orchards and gardens. Delicate fruits, such as Mangos, Jambus, Lansas, &c., as they approach to maturity, are ingeniously secured by means of a loose net or basket, skilfully constructed of split bamboo. Without this precaution, little valuable fruit would escape the ravages of the Kalong.

There are few situations in the lower parts of Java, in which this night wanderer is not constantly observed; as soon as the light of the sun has retired, one animal is seen to follow the other at a small but irregular distance, and this succession continues uninterrupted till darkness obstructs the view. The flight of the Kalong is slow and steady, pursued in a straight line, and capable of long continuance. The chase of the Kalong forms occasionally an amusement to the colonists and inhabitants, during the moonlight nights, which in the latitude of Java are uncommonly serene. He is watched in his descent to the fruit trees, and a discharge of small shot readily brings him to the ground. By this means I frequently obtained four or five individuals in the course of an hour; and by my observations I am led to believe, that the varieties above described, belong to one species, as they appear all to live in one society, and are obtained promiscuously. I have only further to add, that when it is considered that the numerous Chiroptera which are found in Europe, have only recently been distinguished with accuracy, some indulgence may be claimed in the determination of a species, collected in a distant climate, without the means of forming an acquaintance with the late additions to this genus in different countries.





PTEROPUS ROSTRATUS.

Engraved by W. Taylor.



# PTEROPUS ROSTRATUS.

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ORD. III<sup>me</sup> CARNASSIERS, *Cuvier*. 1<sup>re</sup> Famille. Les Cheiroptères.

ORD. I. PRIMATES, *Linn.* Syst.

ORD. XI. VOLITANTIA, *Illiger*. Fam. 32, Chiroptera.

PTEROPUS, *Briss. Erxleb. Cuv. Geoffr. Illig.*

VESPERTILIO, *Linn. Gmel. Bodd.*

SPECTRUM, *Lacep.*

CHAR. GEN.—*Dentium formula; Primores*  $\frac{4}{4}$ , *Laniarii*  $\frac{1-1}{1-1}$ , *Molares*  $\frac{5-5}{6-6}$ . *Laniarii*

distincti, primoribus longiores, conici. *Molares* obducti tritores tuberculati.

*Rostrum* acutum. *Nasus* prosthernate nullo. *Auriculæ* mediocres oblongæ.

*Corpus* patagio digitali, lumbari, et anali, denudatis cinctum. Patagium anale excisum. *Cauda* aut brevis aut nulla. *Mammæ* apertæ duæ pectorales.

*Pedes* pentadactyli, antici chiropteri, halluce et digito primo unguiculatis, reliquis digitis inermibus; postici ambulatorii. *Ungues*: falculæ acutæ, antipedum digitis elongatis, tribus interioribus exungiculatis.

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\* ECAUDATI.

Pteropus corpore fusco concolore ex isabellino canescente, patagio saturatiore, rostro elongato.

*Lowo-assu*, of the Javanese.

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IN one of the next succeeding Numbers of these Researches, I propose to exhibit a connected view of the various Chiroptera which I have observed in Java. A large proportion of these has not previously been examined or described. Of the Genus Pteropus, four species have been arranged at the Museum of the Honourable East India Company; two of these belong to the first, and two to the second subdivision of the Genus: the former comprises those that are entirely without tails; the latter those that are provided with short tails.

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The specific name of the species now under consideration was suggested by the comparative length of the rostrum or muzzle. By the natives of Java it is called *Lowo-assu*, literally *Dog-bat*. In the examination of the *Pteropus rostratus*, I have had before me three adult specimens, in a perfect state of preservation, two males and one female, agreeing in size, colour, and general appearance. Several other specimens are deposited in the Museum at the India House. The figure which illustrates this article, represents our animal of the size of life.

The entire length of the *Pteropus rostratus*, from the tip of the nose to the extremity of the body, is three inches and one half, of which the head and neck comprise nearly one half. The extent of the wings is eleven inches and six lines. The greatest breadth of the body, between the breasts, is twelve lines; the length of the arm and forearm is two inches and one line; and of the middle finger, which terminates the wing, three inches and one line. The naked thumb, comparatively with other species of *Pteropus*, is of moderate length; but the claw is large, sharp, strongly compressed, and hooked. The index terminates nearly at an equal distance between the thumb and the third phalanx of the middle finger; its claw is acute and short. The posterior extremities measure one inch and three lines in length; the toes are distinct, as in the other species, and armed with sharp, greatly curved claws. The interfemoral membrane is unusually narrow, without the vestige of a tail, and in a great measure concealed by the hairs which terminate the body.

The head of the *Pteropus rostratus* has a singular form; from the region of the ears to the eyes it is broad, oblong, and of nearly uniform dimensions; immediately anterior to the eyes it is suddenly contracted, and extended into a rostrum, the proportional length of which affords a marked specific distinction. The form of this rostrum or muzzle is nearly cylindrical, and it constitutes fully one-third of the length of the head. The nose is obtuse and emarginate; and the nostrils are large, circular, and pierced from the sides. The gape or expansion of the mouth is moderate, and does not extend beyond the rostrum. The upper jaw is somewhat wider than the lower, and both are of equal length. A few minute solitary bristles are scattered on the rostrum, and the upper lip is surrounded by very minute hairs.

The teeth agree in number with those of the other species of *Pteropus*, but present in their structure and disposition the following peculiarities. In the upper jaw the front teeth are minute, cylindrical, obtuse, distant, and not arranged in a regular series; the intermediate teeth are placed anteriorly at the extremity of the jaw, while the lateral teeth are removed farther back; they describe an arch, while in other species they form a right line. The canine teeth are very long, slender,

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slightly curved, with a very small distension at the base. The grinders are very narrow: the two anterior teeth having an elevated point, which is obliquely truncated, while the posterior teeth are low, with an even surface, much worn by trituration. In the lower jaw the front teeth have the same form and disposition as in the upper. The canine teeth are equally long, slender, and curved. The first grinder is very minute, and placed in contact with the canine tooth; after a considerable vacancy, follows the second grinder, which is elevated, and obliquely truncated above; the third has a similar form, but is less projecting; the fourth, fifth, and sixth are greatly compressed, and resemble the third, fourth, and fifth in the upper jaw. There is a small difference in the disposition of the grinders in the upper and in the lower jaw: in the former the series is perfectly regular; in the latter a slight contraction takes place near the canine tooth, posterior to which the series has a more evident lateral tendency.

The eyes, as in other species of *Pteropus*, are large and prominent; the pupil is circular, and the iris dark. The ears consist of a simple auricle, which is oblong, rounded, and half an inch in length. The body, both above and underneath, the arms, the neck, head, and face are covered with exquisitely fine, short, silky hairs, very soft to the touch, of a brown colour, with a tint of Isabella yellow, inclining to gray. In some of the specimens the under parts have a lighter grayish hue. On the anterior part of the back, on the breasts, and on the extremity of the body near the vent, the hairs are longer, and delicately woolly; they gradually decrease in length from the forehead to the nose, and towards the hands and legs. As the colour is more intense at the extremity of the separate hairs, different shades of brown and yellowish gray are exhibited, according to the accidental undulations which exist on the surface.

The *Pteropus rostratus*, or *Lowo-assu* of the Javanese, is far less abundant than the *Pteropus javanicus*, or *Kalong*; but it still exists in sufficient numbers to commit serious injury among the plantations and fruit-trees. Like other species of *Pteropus*, it feeds on fruits of every description, but particularly infests the various species of *Eugenia* or *Jambu*, which are cultivated in gardens. During the day it remains suspended under branches of trees, or it retires under roofs of old houses and sheds. At night it sallies forth, like other species of *Pteropus*.









TUPAIA JAVANICA.

*Drawn by W. Daniell.*

*Engraved by W. Taylor.*



## TUPAIA JAVANICA.

ORD. III<sup>me</sup> CARNASSIERS, *Cuvier*. 2<sup>de</sup> Famille. Les Insectivores.

ORD. III. FERÆ, *Linn.* Syst.

ORD. XII. FALCULATA, *Illiger*.

TUPAIA, *Raffles, Act. Soc. Linn. Lond.*

CHARACTER ESSENTIALIS.—*Dentes* maxillæ *primores* intermedii nulli, *laniarii* solitarii, discreti, *molares* septem; mandibulæ *primores* laterales minores, *laniarii* solitarii, obliqui, *molares* sex. *Rostrum* attenuatum rhinario obtuso. *Oculi* prominuli. *Aures* magnæ, heligmate plano. *Cauda* disticha. *Pollex* distinctus. *Ungues* compressissimi, validi.

CHARACTER NATURALIS.—*Dentes primores* supra intermedii nulli, lateralis utrinsecus simplex, erectus, magnus, cylindræus, subattenuatus, apice rotundatus; infra sex procumbentes, lateralis utrinsecus brevissimus, acutus, compressiusculus, intermedii quatuor longissimi, subæquales, horum exterior utrinsecus linearis horizontaliter compressus, interiores subconvergentes, scalpris attenuatis, obliquis, subtransversis, acutatis. *Laniarii* supra parvi, solitarii, discreti, primoribus breviores, subcylindræi, apice paulisper curvati, compressi, infra mediocres, solitarii, conici, basi latiores, obliqui, subcompressi. *Molares* supra utrinsecus septem; tres anteriores unicuspidæ, singuli corona obtusiuscula subtritoria, quatuor posteriores multicuspidæ: primus subcylindræus, attenuatus, discretus; secundus primo simillimus sed minor; tertius oblongus, compressus; quartus acie sectoria omnium longissima, externe gradibus duobus acutis interne gradu tritorio magno auctus; quintus et sextus subæquales, aciebus duabus intermediis sectoriis, externe margine compresso interne gradu maximo tritorio aucti; septimus subtritorius, aciebus tribus brevioribus, obtusioribus. Infra utrinsecus sex; anteriores duo unicuspidæ breves, compressi, conici, gradatim majores; posteriores multicuspidæ: tertius corona obsolete trifida; quartus et quintus consimiles, corona singulis sulco transverso bipartita, margine exteriorè aciebus duabus majoribus interiore quatuor minoribus; sextus subcompressus, parte anteriore aciebus tribus acutis, parte posteriore gradu magno tritorio præditus.

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*Caput* oblongum, depressum. *Rostrum* longum, æqualiter attenuatum; *rhinarium* lateribus compressum, simplex; *nares* laterales, semilunares. *Oculi* maximi, prominuli; *pupilla* circularis. *Aures* magnæ, oblongæ; *heligma* lineare, parte superiore margine prominulo subinvoluta, parte laterali plano capite adpresso; *antihelix* parallela, hinc inde pilosa; *tragus* mediocris, nudus, meatu auditorio ex parte inflexus; *antitragus* conico-depressus, nudus, auris cavitate medius. *Vibrissæ* breves, labii superioris plures, menti et genarum rariores.

*Corpus* cylindraceum, gracile, codario et pilis mollissimis tectum. *Cauda* corpore longior, linearis, compressa, villis longis in serie disticha dispositis. *Mammæ* apertæ, quatuor ventrales.

*Pedes* ambulatorii, plantigradi, pentadactyli, fissi. *Plantæ* nudæ. *Digiti* compressi, pollice distincto maniculis podariisque; digitus minimus posterior liber, intermediis longiores subæquales. *Ungues* omnes consimiles falculares, compressi, validi, pilis rigidiusculis obtecti.

**AFFINITAS.**—Genus TUPAIA, characteribus pluribus, animalibus INSECTIVORIS ordinis SARCOPHAGORUM *Cuvieri*, similitudinem habet: dentibus laniariis molaribusque MYGALE, rostro elongato SORICE convenit; discrepat tamen dentibus primoribus, rhinario obtuso proboscide carente, oculis, auribus, habitu corporis aliisque characteribus. Nec hucusque satis apparet, nonne systemate naturali TARSIS ordinis QUADRUMANORUM magis affine sit quam animalibus subterraneis familiæ Insectivororum. Genus nostrum agilitate formaque gracili, aspectu Sciuri quasi larvatus, characteribus aliis RODENTIS plane diversum est.

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Tupaia rostro mediocri, cauda longissima, corpore supra fusco et cano vario subtus strigaeque scapulari ex albo-canesciente.

Bangsring, or *Sinsring* of the Javanese.

IN the Malayan language the name of TUPAI is a general term for various small animals which have the external form and the agility of the Squirrel; while each different species, agreeably to the observations of the natives of the Islands of the

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Eastern Archipelago, where these animals are found, is distinguished by a particular epithet. Thus two small animals, which, according to our classification, belong to the genus which has been above described, are denominated TUPAI PRESS and TUPAI TANA; while several other animals, belonging to the genus Sciurus, are denominated TUPAI JINJANG, TUPAI TANKRAWA, &c. The generic name placed at the head of this article, was first proposed in the Catalogue of a Zoological Collection made in Sumatra by SIR T. STAMFORD RAFFLES, and published in the thirteenth Volume of the Transactions of the Linnean Society of London. It is a simple modification of the Malayan term TUPAI; and from the comprehensive manner in which this is used by the natives of the Islands of the Eastern Archipelago, it may claim a place in our systems, perhaps with more propriety than many names borrowed from the languages of the countries where the animals to which they are applied, are indigenous. Three species of TUPAIA have hitherto been discovered; two of these are natives of Sumatra, Penang, and Singa-pura, while the third has been found exclusively in Java, where it is distinguished by the name of BANGSRING, or SINSRING.

The generic description above detailed, exhibits accurately the characters of the *Tupaia javanica*, of which two very perfect specimens are contained in the Collections of the Honourable East India Company. Of each of the two other species, individuals in a good state of preservation were sent by SIR STAMFORD RAFFLES to SIR EVERARD HOME, for the Royal College of Surgeons; and through the liberality of the Board of Curators of that noble Institution, I have been enabled to give a figure and description of the *Tupaia Tana*, in this Number of the Zoological Researches, and to consult and compare the peculiar characters of the *Tupaia ferruginea*. In my inquiries relating to this genus, I have therefore enjoyed the advantage of having before me all the species that have hitherto been discovered; and before I proceed to the description of the *Tupaia javanica*, I shall enumerate concisely those characters in which they all agree. These shew themselves, first, in the same number and disposition of the front and canine teeth, as well as of the grinders, and in the length and conical form of the rostrum, which being obtuse, and without that proboscoidal elongation that exists in *Sorex*, *Mygale*, and the rest of the *Insectivores* of Cuvier, to which they are allied in the system of dentition, affords a clear distinctive character. These animals further closely resemble each other in the prominence of their eyes, in the form of their ears, in the number and disposition of their toes and claws, in the general contour of their body, fitted for great agility, in the quality of their fur or hairy covering, in the proportional length and form of their tail, and in certain peculiarities in the distribution of colours and distinctive marks.

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The particulars which apply to the teeth of the three species hitherto discovered, generally, are the following, as to number—

UPPER JAW—2 front teeth, 2 canine teeth, 14 grinders.

LOWER JAW—6 ditto 2 ditto 12 ditto.

They have in the upper jaw no intermediate, but two large cylindrical, erect, and rounded lateral front teeth, placed at the angle of the jaw; further—one canine tooth on each side, which is smaller than the front tooth, very slightly curved towards the point, and solitary, being placed at an equal distance from the other teeth; and seven grinders on each side, of which the three first are small, having a single point, and the four posterior teeth compound, and marked with several sharp elevated points on the surface. In the lower jaw they have individually six procumbent front teeth, of which the four intermediate teeth are very long, and the outer one on each side very short; further—one large canine tooth on each side, having a broad base, and tending obliquely outward; and six grinders, the two first of which are small, and consist of a single point, while the four posterior teeth are compound, having a broad crown, from which several sharp points project.

For a distinct view of those characters, which are common to all species of *Tupaia*, I refer to the Plate of Illustrations, in which Letters I, K, & L exhibit the teeth of *Tupaia Tana*; Letters M & N, those of *Tupaia ferruginea*; and Letters O, P, & Q, those of *Tupaia javanica*.

I proceed, after these general remarks, to describe the *Tupaia javanica*. The *BANGSRING* has the appearance of a sprightly animal; and as far as its manners are known, it perfectly agrees with this character. Its body is graceful, and handsomely formed, and its limbs are slender, and fitted for great agility: its size and exterior habits so nearly resemble the individuals of that family which Illiger has denominated *animalia agilia*, that, on a superficial view, it has been considered to belong to it. Our animal agrees with one of the most numerous sections of this family, the Squirrels, in the form of the body, the proportional length of the extremities, the breadth of the tail, and the faculty of carrying it on the back as a plume; but the succeeding details will shew that its structure and organization are essentially different.

The head of the *Tupaia javanica* is oblong, rather depressed, and very gradually attenuated to a conical muzzle, which is somewhat compressed laterally. The nose is obtuse and naked. The nostrils are slightly curved, somewhat broader in the middle, and pierced from the sides. The upper jaw surpasses the lower but little in length. From the upper lip are protruded mustaches, consisting of numerous short, slender

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hairs, and a few solitary bristles arise from the cheeks and chin. The eyes are very large and prominent, and situated at an equal distance from the gape or opening of the jaws, and from the crown of the head: the pupil is circular, and the irides are dark. The ears offer some peculiarities both in their disposition and form. They are externally provided with a large helix, which being margined in the upper part, passes in an angle to the sides, where a well-defined antihelix runs parallel to it, and between both patches of short hairs are scattered without regularity. The tragus is of moderate size, and naked, representing a scale, which is inflected in part over the meatus auditorius externus, and is calculated to cover it entirely, whenever the economy of the animal requires this organ to be protected. The antitragus is naked, and occupies a considerable portion of the auricular cavity. The ears are situated far behind, near the commencement of the neck, which is of moderate length, and differs but little from the head in dimensions. The anterior extremities are slender, and somewhat shorter than the posterior: the latter are considerably more robust, and the thighs are muscular, and calculated for vigorous exertion. The feet are plantigrade, and the soles perfectly naked; the tarsi of the posterior extremities are considerably longer than those of the anterior, and the manner in which the feet are placed on the ground, gives a peculiar character to the gait and appearance of our animal. Each foot is provided with five slender, compressed, distinct toes. The three intermediate toes have a similar disposition in both extremities; the middle toe scarcely exceeds the lateral ones in length. The small toe is shorter, and placed more posteriorly. The thumb is perfectly distinct, and moveable in a direction opposite to the others; in the hind foot it is placed at a greater distance from the toes than in the fore foot.

In the Plate of Illustrations, Letter G represents these details in the fore, and Letter H in the hind foot.

The claws are sharp, compressed, and curved, and in comparison with those of *Sorex*, and several other genera of this order, of considerable strength; they are individually supported by a small protuberance, similar to that which is found in the *Tarsii*; and the construction of the claws in *Bangsring* is adapted to the same food and habits as those of the other species of *Tupaia*. The tail is of the same length as the body and linear, compressed with the hairs spreading far on each side; but it is less full and ornamental than in the *Squirrel*.

The *Bangsring* is closely covered with fur, which is remarkably delicate and silky on all the under parts: on the back, neck, sides, tail, and on the extremities above, the hairs are longer and straight, arising from a similar silky down, not rough or straggling, but closely applied to the skin; a few longer more rigid hairs,

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of a darker colour, and shining, are dispersed among the rest: the length of the hairs gradually decreases from the forehead towards the nose, and on the extremities towards the feet. In all the species of *Tupaia* a considerable uniformity prevails in the distribution of the colours; the upper parts have a dark, the lower a lighter tint, and a regular narrow streak extends from the neck over the shoulder. In the *Bangsring* the upper parts are brown, slightly diversified with gray, of different shades; the lower parts are dirty white, with a slight tint of grayish; the tail agrees with the upper parts, and the scapular line, which is nearly an inch long, agrees with the neck. The mixture of colours which is observed in the upper parts, is produced by alternate bands of gray, and blackish in the longer hairs. The extremity of the nose is brown, and the claws have a horny hue.

DIMENSIONS.

	Inches.	Lines.
Length of the body and head, from the extremity of the nose		
to the root of the tail	6	5
..... the head.....	1	9
..... the rostrum	0	8
..... the neck	0	8
..... the tail	6	5
..... the anterior extremities	2	2
..... the posterior extremities	2	6 $\frac{1}{2}$
..... the tarsus alone	1	2 $\frac{1}{2}$

Although *Tupaia* has been placed among the *Insectivores*, which, agreeably to the classification of the celebrated Cuvier, constitute the second family in the order of *CARNASSIERS*, its arrangement in a natural system requires further consideration. It is necessary for this purpose that we should be more fully acquainted with its internal structure, and with its manners and habits, than we are at present; for although in certain characters it approaches near to the genera *Sorex* and *Mygale* among the *Insectivores*, yet in others it strikingly resembles *Tarsius* among the *Quadrumanes*, and withal it is masked by the external form and appearance of a Squirrel. I can at present only exhibit its resemblance to each of the families above mentioned, and enumerate those characters that belong to it exclusively.

In the first place, *Tupaia* agrees with the animals of the second family of the *Insectivores*, in the elongated form of its rostrum, and in certain peculiarities of its dentition. In the latter it is most nearly allied to the genus *Mygale*. This is provided with seven grinders in the upper, and six grinders in the lower jaw, of which the anterior teeth are simple, consisting of single points, while from the crown of the

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posterior numerous sharp protuberances of different length project. The resemblance of the grinders of Tupaia and Mygale is more clearly shewn by a comparison of the Plate annexed to the Continuation of MR. FRED. CUVIER's excellent Essay on the Characters for the Genera of Mammalia, contained in the XIIth Volume of the "Annales du Museum," with the Illustrations of the Genus Tupaia given in the present Number of these Zoological Researches, than by a long description. Mygale is also the only genus among the Insectivores which agrees with our animal, in having in both jaws single well-defined canine teeth; but the incisors of Tupaia differ essentially from those of all other animals of this family, as will appear in the sequel. As far as regards the rostrum of Tupaia, it should be observed, that although it is long and tapering, the upper jaw projects but slightly beyond the lower, and is not extended into a naked proboscis, which constitutes a peculiar character as well in Sorex and Mygale, as in other genera of this family. Of other characters it should be noticed, that the eyes in most genera of the Insectivores are minute, or scarcely perceptible, while in Tupaia they are large and prominent. The structure of the external ear is also entirely different in our animal; in Sorex, for instance, in which this organ is most developed, the *antitragus* is enlarged to such a degree as to close the meatus auditorius, while the helix has a similar disposition, and can be folded over it as a double membrane. In Tupaia, on the contrary, it is the *tragus* which is so constructed as to afford a covering to the external passage, while the antitragus is a simple eminence in the cavity of the ear; the helix constitutes a narrow border, forming an extensive circuit about the auditory passage, and can only be elevated to regulate the admission of sound, without affording an additional covering, as it does in Sorex. Tupaia is further destitute of those glands which in Sorex and Mygale are placed in the sides of the body, or at the root of the tail, and which by their odoriferous secretion constitute a very peculiar character. The form and habit of the body, the length and structure of the extremities, and the broadness of the tail, give to Tupaia a physiognomy entirely different from that of the Insectivores hitherto known. It is this external appearance which has led to its association with Squirrels. But a more accurate examination of these animals shews that they differ greatly in those characters which constitute a natural affinity; and to explain this difference, it is sufficient to compare the form of the head, the mechanism of the feet, the structure of the eyes and ears, and particularly the system of dentition. In the latter, Tupaia exhibits considerable affinity to the genus Tarsius. This appears not only in the peculiar character of the front teeth, but also in that of the grinders, which are covered with high projecting points, separated from each other by longitudinal and transverse grooves. A comparison of the teeth of the Tarsius bancanus, as given in the Plate of Illustrations to the Second Number of these Researches, with those of Tupaia javanica, represented on the Plate annexed to this, will exemplify

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their affinity. Our animal has a further resemblance to *Tarsius* in the form of the feet, in the deep division and free motion of the toes, in the great length of the tarsus of the hind foot, and particularly in the size and prominence of the eyes. But further observations are required to indicate whether in the system above mentioned, *Tupaia* should be arranged among the *Quadrumana*, after the *Tarsii*, or among the *Insectivores*, in a section distinct from those animals which lead a subterraneous life. In this inquiry we should consider that *Tupaia* is provided with a small cœcum. This appears from a concise account of one of the species, probably the *Tupaia ferruginea*, prepared by MR. DIARD. I regret that I have no other means of referring to this account than that which is afforded by the notices concerning the Meetings of the Asiatic Society, which are from time to time given in the Calcutta Gazette. From a republication of these, contained in the Xth Volume of the Asiatic Register, I extract the following :—" On the 10th of March, 1820, was brought to the notice of the Society, a drawing and description of a small quadruped, native of Penang, and other Islands of the Indian Seas, by the French Naturalist, M. DIARD, and presented in the name of the Honourable SIR STAMFORD RAFFLES." After the description of the system of dentition, MR. DIARD proceeds :—" A ces particularités dans la dentition de notre animal, si l'on ajoute la presence d'un petit cœcum a l'origine des intestines; cœcum qu' aucun des *Sorex* n'a encore présenté, on aura certainement tout le droit possible de le prendre pour type d'une nouvelle sous-division; nous lui assignerons le nom de *SOREX-GLIS* qui donne a la fois, l'idée de la forme extérieure et de sa véritable nature. Enfin pour terminer l'histoire de ce véritable *Sorex*, déguisé sous des habits d'écureuil, nous ajoutons, qu'il a de grands yeux, quatre mamelles ventrales, une langue longue, un estomac simple, et une tube intestinal replié sept fois sur lui-même, et suivi, comme nous l'avons déjà dit, d'un petit cœcum."

In further illustration of the history of the *Tupaia javanica*, or *Bangsring*, I have to remark, that it belongs to a genus which has hitherto been only found in the Islands of the Eastern Archipelago, where the individuals are by no means common. Three species, as far as I have ascertained, have hitherto been discovered. The *Tupaia ferruginea*, the *Tupai-Press* of the Malays, has the most extensive range; it inhabits Penang, Singa-pura, and certain portions of Sumatra. The *Tupaia Tana* has hitherto been found in Sumatra alone, and the *Bangsring* is exclusively a native of Java. The only notices of the *Tupaia ferruginea* and of the *Tupaia Tana*, which have hitherto been made public, are contained in SIR STAMFORD RAFFLES's descriptive Catalogue of a Zoological Collection, from Sumatra, published in the XIIIth Volume of the Transactions of the Linnean Society, and in the notices, above referred to, of the Meetings of the Asiatic Society of Calcutta.

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The Bangsring fell under my observation during an early period of my researches in Java. In traversing the Province of Blambangan, in the year 1806, I discovered it in the extensive forests which cover almost entirely the eastern extremity of the Island. Constant and careful researches, since that period, have neither enabled me to meet with it again, nor to ascertain that the natives in other parts of Java are acquainted with it: and although its range may not be confined exclusively to the Province of Blambangan, yet, agreeably to my observations, it is extremely limited, both in residence and numbers. During the period above mentioned, I obtained but two individuals. One of these was forwarded to the Museum of the Honourable East India Company in 1812, with a few remarks on its locality, food, and manners; and the other formed part of the collection which was brought to England by me in 1819.

I have to regret that the information which I was enabled to collect during my passage through the districts which the *Tupaia javanica* inhabits, was extremely scanty, and not calculated to illustrate those circumstances which are most interesting in its economy, and on which its final arrangement will depend. Our animal was obtained, at one period only, in the extensive and almost inaccessible forests of the Province of Blambangan: here the natives described it as living on trees, and feeding on fruits and nuts. But this intelligence must be received with due limitation. The system of dentition evinces that the Bangsring is more adapted to animal than to vegetable food: to elucidate this, it is sufficient to examine carefully the structure of the teeth. Thus, for instance, we find in the upper jaw, on each side, one erect front tooth, of great length, calculated effectually to answer the purpose of the canine teeth, which, from a peculiarity of structure in this genus, and in several allied genera, both among the Insectivores and Tarsii, are shorter than the front teeth. The fourth grinder is provided with a lacerative point, of uncommon length; the fifth and sixth grinders are of a compound nature; in the middle of the crown they have two erect, high, acute points, which give most decidedly the character of carnivorous animals, while an extensive even projection (or gradus) on the inner side, affords a triturating surface. In the lower jaw the front teeth have that disposition which also occurs in the Insectivores, Tarsii, and Rodentia; they are adapted both to animal and vegetable food; but the third, fourth, and fifth grinders correspond with the fourth, fifth, and sixth grinders in the upper jaw, and are provided with high sharp points, which are found exclusively in carnivorous animals. Those characters in the system of dentition that are adapted to vegetable food, shew themselves in the first, second, and third grinders in the upper, and in the first and second in the lower jaw, which, in Bangsring, are obtuse; in the large triturating surface, on the internal side of the fifth and sixth grinder of the

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upper jaw, as above described, and in the posterior portion of the last grinder in both jaws. All these peculiarities are distinctly exhibited on the Plate of Illustrations in Letters O, P, & Q, to which I refer.

I have only to add the following particulars regarding the manners and food of the species of *Tupaia* in general. SIR T. STAMFORD RAFFLES, in the descriptive Catalogue above mentioned, in describing the *Tupaia ferruginea*, remarks—"the tame one above mentioned was suffered to go about at perfect liberty, ranged in freedom over the whole house, and never failed to present himself on the breakfast and dinner table, where he partook of fruit and milk." And in the communication extracted from the proceedings of the Asiatic Society, it is stated, "that a living animal of this species (*T. ferruginea*) was brought to Bengal by a medical gentleman some months ago: it runs about the house tame, but will not allow itself to be caught for close inspection. Though at liberty to run out of doors whenever it likes, it shews no disposition to leave its quarters, and evinces some attachment to the family; for whenever strangers enter the house, it shews disquietude, and makes a chattering noise. It occasions no trouble in feeding, for it is always on the search after insects, and its favourite food seems to be flies, crickets, grasshoppers, and cockroaches."



6 Inches

TUPAIA TANA.

TUPAIA TANA.



ORD. III^{me} CARNASSIERS, *Cuvier*. 2^{de} Famille. Les Insectivores.

ORD. III. FERÆ, *Linn.* Syst.

ORD. XII. FALCULATA, *Illiger*.

TUPAIA, *Raffles, Act. Soc. Linn. Lond.*

CHARACTER GENERICUS.—*Vide* Tupaia javanica.



Tupaia rostro longissimo, corpore supra fusco et nigrescente vario subtus strigaeque
scapulari ex badio rufescente.



Tupai-tana, of the Inhabitants of Sumatra.

Tupaia tana, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra, Tr. Linn.*
Soc. XIII. p. 257.



THE Tupaia tana has already been enumerated in the account of the Tupaia javanica. We owe the discovery to SIR STAMFORD RAFFLES, who having given a description of it in his Catalogue of a Zoological Collection made in Sumatra, forwarded the first specimen to England. An examination of this having with great liberality been afforded to me by the Board of Curators of the Royal College of Surgeons, I have been enabled to give some details regarding its external appearance, its teeth, and dimensions. I have also added a figure of the animal, and those peculiarities in the species which will tend to illustrate the genus Tupaia in general.

The Tupaia tana is the largest species of the genus hitherto discovered. Its dimensions are the following:—

	Inches.	Lines.
Length of the body and head, from the extremity of the nose		
to the root of the tail	10	5
..... the entire head	2	6
..... the rostrum, or attenuated part of the head	1	4
..... the neck	1	0

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	Inches.	Lines.
Length of the body	7	0
..... the tail	6	6
..... the anterior extremities	3	0
..... the posterior extremities.....	4	2½

Regarding the system of dentition of the *Tupaia tana*, it should be noted that, although it agrees with the other species in all essential characters, it possesses certain peculiarities, which I shall proceed to enumerate with accuracy. In the upper jaw, the front teeth are proportionally large, and have a slight inclination at the extremity. The canine teeth are more hooked than in the other species. Of the grinders, the three first do not terminate in an obtuse triturating surface, as in *Tupaia javanica*, but are gradually attenuated to a point, which in the second and third tooth is sharp and elevated. They are all considerably compressed at the base. The lacerative points, projecting from the crown of the fourth, fifth, sixth, and seventh grinders, are long, and have the same disposition as in *Tupaia javanica*; but the triturating surfaces of the fifth and sixth are less extensive. In the specimen from which the description was made, the intermediate front teeth alone, in the lower jaw, were perfect; but of the two others, on each side, the rudiments remained sufficiently evident. The canine tooth is proportionally longer and more hooked than in the *Tupaia ferruginea* and *Tupaia javanica*. The first grinder is acute, slightly hooked, and shorter than the canine tooth; the second is obscure; the third is considerably elevated, broad at the base, and compressed with a small anterior and posterior heel; the fourth is somewhat larger than the fifth, but both agree in their construction; they have individually three sharp points projecting from the crown; the sixth is smaller, and presents three less elevated points. From these details, and from the comparative view which is afforded on the Plate of Illustrations, in Letter I and in Letter O, it appears that the *Tupaia tana* is distinguished from the *Tupaia javanica* by a greater length of its canine teeth, and of the lacerating points in all the grinders. This character is undoubtedly accommodated to its habits, and shews it to be more exclusively adapted to animal food than the *Bangsring*.

An elongation of the rostrum or muzzle is characteristic of all the species of this genus, but in *Tupaia tana* this character exists in the greatest degree. In *Tupaia javanica* the rostrum is shorter than the head; in *Tupaia ferruginea* it is nearly of the same length; but in *Tupaia tana* it is one third longer. This elongation gives a very peculiar physiognomy to our animal, and in consequence of the length of the jaw, the interstices between the teeth are greater than in the other species; this appears distinctly in the profile of the head given on the Plate of Illustrations. The attenuation of the rostrum is almost uniform from the crown of the head to its

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extremity; a very slight depression is observed a little anterior to the region of the eyes. The nose is of a brown colour, slightly compressed at the sides, and considerably extended beyond the lower lip; the nostrils are lateral, curved, and broader in the middle. The head, between the region of the eyes and the ears, is somewhat depressed; it is connected with the neck, as in the other species, without any diminution in the dimensions of the latter. The whiskers arising from the upper lip, the chin, and the forehead, are short, and not numerous. The eyes are large and prominent, and exhibit the same character as in the other species; the pupil is circular, and the irides are dark. The ears are placed at a great distance from the eyes; they are large, oblong, and provided with a narrow, rather membranaceous heligma, which is closely applied to the head; they resemble, indeed, in all essential points, so nearly these organs in *Tupaia javanica*, that they require no detailed description. The neck is shorter than the head, and increases gradually in dimensions towards the breast. The body, as in the other species of *Tupaia*, is gracefully formed, rather oblong, somewhat thicker at the rump, and, in the specimen from which the description is made, the back is slightly arched. The tail, in *Tupaia tana*, has a greater resemblance to that of Squirrels than in *Tupaia javanica*; the hairs spread in all directions, and give it a bushy appearance; its proportion in length to the body, cannot be given with perfect accuracy, as a portion appeared to be wanting in the specimen. The anterior extremities are shorter than the posterior; they are thicker near the shoulder, and gradually tapering towards the feet; the tarsus is of moderate length. The feet and toes agree in length and division with those of the *Bangsring*. In the posterior extremities the thighs and legs are robust, and the tarsi proportionally of great length. Of the toes the intermediate one is longest; the next on each side are somewhat shorter, and the thumb is placed further back than the small toe. The claws have the same general character on both extremities; they are strongly compressed laterally, but broad in a horizontal direction, much curved, and fitted more for seizing their prey, than for digging the earth; they are rather wider and more vigorous on the posterior extremities, and individually covered by a delicate tuft of long hairs arising from the extremity of the toes.

The fur of the *Tupaia tana* is soft and delicate. The general colour of the upper parts is dark brown inclining to black; of the lower, brown, with a reddish tint. The separate hairs of the upper parts are banded alternately with grey and dark brown, so as to form a variegated surface. The colour of the back is deeper than that of the sides, and it increases in intensity towards the rump. Our animal further exhibits the following distribution of distinctive marks:—The head and snout are mixed blackish and gray; the throat is grayish, with a rufous tint. The

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occiput is marked with a narrow transverse band of black, constituting a very obscure crest, from which a narrow dark-brown streak passes along the upper part of the neck; this gradually increases in breadth between the shoulders, and descending along the back, is lost in the dark fur which covers the posterior part of the body above. It is bounded on each side by a streak of a lighter tint than that of the upper parts in general. The peculiar characteristic mark of all the species of this genus shews itself in our animal, in an obliquely-transverse band, of the colour of the under parts, extending from the neck across the shoulders to the back.

The under parts of the neck and body, as well as the tail and the extremities, are of a reddish brown colour, with a tint of bright ferruginous. This colour becomes dark and brownish on the feet. The tarsi above are covered with very short hairs; and small tufts of hair of a brown colour arise from the extremity of the toes, and are partially spread over the claws.

A view of the head in profile, of the size of life, is given in Letter A, and a view as it appears when seen from above, in Letter B, of the Plate of Illustrations. The other details relating to our animal, will be explained in their proper place.

The *Tupaia tana* is represented in the figure, in the attitude of the specimen above referred to, belonging to the Museum of the Royal College of Surgeons. The animal is capable of climbing trees as well as the other species, although the name of the natives conveys the idea of a residence on or near the ground. This is also stated by SIR STAMFORD RAFFLES in his description. Our animal is a native of Sumatra, and generally known by the country people under the name of *Tupai-tana*.



1 ft.

URSUS MALAYANUS.

Engraved by W. Daniell.

URSUS MALAYANUS.

ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille. Les Carnivores. 1^{re} Tribu,
Plantigrades.

ORD. III. FERÆ, *Linn.* Syst.

ORD. XII. FALCULATA, *Illiger*. Fam. 34, Plantigrada.

URSUS, *Linn. Cuv. Geoffr. Illig. &c.*

Dentes Primores utrinque sex, inferiorum secundus exterior basi crassior, interior.

Laniarii distincti primoribus longiores, conici. *Molares* obducti supra utrinsecus sex: primus dimotus minutus, secundus minutus deciduus, reliqui tritores tuberculati: tertius parvus, quartus triangularis, quintus subquadratus, postremus maximus oblongus longitudinalis; infra utrinsecus quinque: primus dimotus laniario proximus, reliqui tritores tuberculati: secundus unituberculatus, tertius et quartus oblongi, postremus quarto minor subquadratus.

Rostrum productum. *Nasus* prominulus, rhinario lato obtuso. *Lingua* lævis.

Auriculæ mediocres rotundatæ.

Corpus villosum codario pilis intermisto. *Cauda* abrupta. *Mammæ* apertæ, quatuor pectorales, duo ventrales. *Folliculus* supra anum nullus.

Pedes distincti ambulatorii plantigradi pentadactyli fissi. *Plantæ* denudatæ callosæ.

Ungues: falculæ acutæ. *Illiger*.

Ursus ater, pilis brevibus rigidis, rostro ferrugineo, pectore macula semilunari alba.

Bruang, of the Malays.

Ursus malayanus, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra. Trans.*

Linn. Soc. XIII. p. 254.

IN the figure which illustrates this article, the *Ursus malayanus* is carefully represented from a specimen contained in the Museum of the Honourable East India Company. This was forwarded to England by Sir Stamford Raffles in the

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year 1820; and the account of it contained in his Descriptive Catalogue of a Zoological Collection made in Sumatra, and published in the Thirteenth Volume of the Transactions of the Linnean Society, comprises all that is as yet known of this interesting animal. In communicating this figure to the Public, I shall therefore give Sir Stamford's description entire in his own words, and add a concise account of the specimen which is now deposited in the Museum at the India House.

"This deserves to be ranked as a distinct species from the common Bear, and from that of the continent of India. The most striking difference is the comparative shortness of its hair, and the fineness and glossiness of its fur; in which particular it appears to resemble the American Bear. It is further remarkable in having a large heart-shaped spot of white on the breast. The muzzle is of a ferruginous colour. It stands lower, but is a stouter and better proportioned animal than the common Bear.

"When taken young, they become very tame. One lived two years in my possession. He was brought up in the nursery with the children; and when admitted to my table, as was frequently the case, gave a proof of his taste by refusing to eat any fruit but mangosteens, or to drink any wine but Champaign. The only time I ever knew him out of humour was on an occasion when no Champaign was forthcoming. It was naturally of a playful and affectionate disposition, and it was never found necessary to chain or chastize him. It was usual for this Bear, the cat, the dog, and a small blue mountain bird or Lory of New Holland, to mess together, and to eat out of the same dish. His favourite playfellow was the dog, whose teasing and worrying was always borne and returned with the utmost good humour and playfulness. As he grew up he became a very powerful animal; and in his rambles in the garden, he would lay hold of the largest plantains, the stems of which he could scarcely embrace, and tear them up by the roots.

"A female of this species was sent to England last year by the William Pitt."
—*Trans. Linn. Soc. XIII. p. 254.*

Description of the Specimen at the India House.—Head short, conical, very gradually attenuated, obtuse, broad between the ears, defined above by a nearly straight line. Nose terminated by a fleshy elongation, consisting of an oblong production of the upper part of the rostrum, covering the nostrils, which are round, and separated by a narrow septum. Gape of the mouth terminating below the anterior canthus of the eye. Lips thin and defined, bounded by a series of short

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stiff hairs. Vibrissæ few in number, and solitary, scattered about the lips. Cheeks even and regular at the surface, agreeing with the conical form of the head. Eyes situated far in front, but vivid and prominent; irides dark. Ears very short, abruptly terminated, appearing as if cropped by art; meatus auditorius covered with hair, arranged like a funnel. Throat regularly rounded, passing gradually to the neck, which is of a moderate length, and somewhat contracted behind the occiput. Body oblong, robust, elevated anteriorly between the shoulders, moderately distended about the abdomen, descending gradually to the rump, which is terminated by a short tail, consisting of an attenuated tuft of bristles, about an inch in length. Limbs robust: anterior extremities thicker near the trunk, tapering towards the feet, elevating the anterior part of the body by their vertical disposition; posterior extremities with very stout muscular thighs, and short, somewhat curved, legs. Feet plantigrade, thickly covered with hairs above, naked underneath; the fore feet somewhat longer than the hind feet. Toes five, all resting on one plane, compressed, not deeply divided, nearly equal in length; exterior toes on each side scarcely perceptibly smaller. Claws very long, strongly compressed and arched; acute, rounded above, grooved underneath, of a pale corneous hue. The heel of the hind foot is slightly elevated in walking, and this foot is, on the whole, both shorter and narrower posteriorly than the fore foot. The colour is jet black on every part, except the muzzle before the eyes, which is dusky gray, and a white semilunar mark, with extended sides on the breast: the form of this mark is nearly represented by the letter *U*: the breadth is about an inch, and the length of each of the sides, from the general base to the extremity, is about six inches. The hairs are short and thickly disposed, so as to form a very dense covering; they are smooth, decumbent, or closely pressed to the skin on every part, excepting the upper parts of the head, neck, and shoulders, on which they are slightly frizzled. The length of the separate hairs is three-fourths of an inch, and they are rigid and strict.

The characters which chiefly distinguish the *Ursus malayanus* from the Bear of India, the *Ursus labiatus* of *Blainville*, which it resembles in the paleness of the muzzle, and in the mark on the breast, have already been mentioned by Sir Stamford Raffles in his description. It is also distinguishable by the comparative shortness of the tail, and by the mildness of the natural disposition. I regret that the materials in the Museum did not afford the means to illustrate the generic character: the skull had been removed from the specimen sent to England, and unfortunately was not contained in the general collection of objects of comparative anatomy from Sumatra, which has been deposited at the Museum of the Royal College of Surgeons.

URSUS MALAYANUS.

DIMENSIONS.

	Feet	Inches
Length of the body and head, from the extremity of the nose to		
the root of the tail	3	8
..... the head	0	11
..... the anterior extremities	1	2
..... the posterior extremities	1	2
..... the fore foot	0	8
..... the hind foot	0	7
..... the claw of the intermediate toe of the fore foot, along		
the curvature	0	2½
Circumference of the body at the most depending part of the		
abdomen	2	9
..... of the neck	2	0



One Foot.

GULO ORIENTALIS.

Drawn by W. Daniell.

Described by H. Smith.

GULO ORIENTALIS.



ORD. III^{me} CARNASSIERS, *Cuvier*.

3^{me} Famille. Les Carnivores.

1^{re} Tribu, Plantigrades.

ORD. III. FERÆ, *Linn. Syst.*

ORD. XII. FALCULATA, *Illiger*.

Fam. 34, Plantigrada.

GULO, *Storr. Cuv. Illig.*

MUSTELA, *Linn.*

URSUS, *Linn. Gmel.*

MELES, *Bodd. Desm.*

MELLIVORA, *Storr.*

CHAR. GEN.—*Dentium formula; Primores* $\frac{6}{6}$, *Laniarii* $\frac{1}{1}$, *Molares* $\frac{5-5}{6-6}$ seu $\frac{4-4}{6-6}$ seu $\frac{4-4}{5-5}$.

Primores utrinque 6, supra externus utrinsecus major, infra secundus exteriore interior. *Laniarii* longi, conici, acuti. *Molares* supra utrinsecus 5, (aliis 4), penultimus maximus, gradu laterali antico unituberculato auctus; postremus tritorius, transversus: infra 6, (aliis 5), penultimus maximus medio bicuspidatus antice gradu acuto postice margine tritorio auctus; postremus parvus tritorius.

Rostrum acutum. *Rhinarium* prominulum. *Lingua* aliis lævis aliis scabra. *Auriculæ* breves.

Corpus pilosum. *Cauda* mediocris aut brevis, laxa.

Pedes plantigradi, pentadactyli. *Plantæ* nudæ. *Ungues*: falculæ, acutæ, compressæ fossoriæ.



Gulo fuscus, corpore elongato, cauda mediocri, gutture pectore genis maculaque verticis ad dorsum longitudinaliter extensa flavicantibus.

Nyentek, of the Javanese.



THE various species of Gulo which have hitherto been discovered, inhabit the northern countries of both Continents, the equinoctial and temperate regions of America, and in Africa, Guinea and the Cape of Good Hope. In arranging in this genus an animal found in a country remote from all these, where its

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range, as far as we know at present, is greatly circumscribed, I have endeavoured carefully to examine its characters. In this examination I have followed the principles of classification detailed with great clearness by M. F. Cuvier in his excellent Memoir, in the 10th Volume of the Annales du Museum, &c. In this he very properly divides the grinders into *false grinders*, fausses molaires; *carnivorous teeth*, carnassières; and *tuberculous teeth*, tuberculeuses. The first are small, pointed, and formed for cutting or tearing the food; they vary in number, from one to three or four in each jaw; the next to these, in both jaws, is the largest grinder, the *carnivorous tooth*, consisting of several points, with an additional heel; to this follows in each jaw in most genera a single *tuberculous tooth*, having a nearly even surface, formed for trituration. In the third family of the Order of *Carnassiers* of Baron Cuvier, the *carnivores*, the grinders in general, assist in affording the means of clear generic distinctions. Our animal agrees in most points with the true Gluttons, as exemplified in the Plate which illustrates the Memoir of M. F. Cuvier, to which I have referred: it has five grinders in the upper, and six in the lower jaw. The three first in the upper, and the four first in the lower jaw, are false grinders; they increase successively in size, having comparatively a broad base, and a somewhat rounded obtuse point; the carnivorous tooth in the upper jaw has three principal points, of which that on the exterior side forms an extended ridge; here it also has, anteriorly, a very minute additional heel: in the lower jaw this tooth is long, and consists of two principal points in the middle; anteriorly it further has one additional heel, and posteriorly it is continued into a rounded triturating ridge. The tuberculous tooth in the upper jaw is large, and placed transversely; in the lower jaw it is small. The front teeth in the upper jaw are very regularly disposed; the exterior tooth, on each side, exceeds the others slightly in breadth, but not in length: in the lower jaw these teeth are all of equal length, but the two exterior ones are broader; the tooth next following them on each side, is removed somewhat interiorly from the general series, and the two intermediate teeth are smaller than these. The *canine* teeth in the upper jaw are rather long, and have an additional projection at the base, which I have not observed so distinctly in other animals of this Family; in the canine tooth of the lower jaw this projection is still more considerable, and extends obliquely backward; from this the tooth is suddenly curved upward and outward, so as to form an angle from the point in which it is in contact with the front teeth.

Our animal further agrees with the Gluttons in the structure of the feet, which are *plantigrade*, or formed for resting, in walking, the entire sole on the ground: the claws likewise have the character belonging to the different species of this genus; they are long, horny, compressed, curved, and obtuse; calculated more for digging the earth, than for seizing other animals; a capacity which they appear to possess in a degree far inferior to *Felis* and *Mustela*. The characters taken from the length of

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the muzzle, from the form of the body, the proportional length of the tail, and of the lobes of the ear, are not uniform in the animals which belong to this genus. The structure of the anal folliculi, as well as of the tongue, requires in most species a further examination.

In the most numerous Catalogue of Quadrupeds hitherto published, which constitutes the article Mammalogie in the *Encyclopédie Methodique*, compiled by Mr. M. A. G. Desmarest, four species of *Gulo* are admitted; namely, *Gulo arcticus*, or *Wolverene*; *Gulo vittatus*, or *Grison*; *Gulo barbatus*, the *Taira* of Buffon and the *Galera* of Brown; and *Gulo capensis*, or *Ratel*. Besides these, the Baron Humboldt has described two animals, inhabiting the equinoctial regions of America, with the names of *Gulo Quietensis*, and *Gulo Mapurito*: but these Mr. Desmarest has added to the genus *Mephitis*; as they are both truly plantigrade, they confirm this character as far as regards the latter genus. Of the species of *Gulo* above enumerated, the *Gulo barbatus*, the *Taira* or *Galera*, appears to have the nearest affinity to *Gulo orientalis*; but the figures hitherto published, afford but imperfect means of comparison.

The *Gulo orientalis* is somewhat smaller than the English Pole Cat. The form of its body, in comparison with other Gluttons, is rather slender: it is thickly covered with fur, consisting of long hairs closely arranged, silky at the base, of a brown colour, and somewhat glossy, with a slight tint of reddish brown; in certain lights it appears diversified, grayish, and tawny. This fur covers greatest part of the body and head, and the whole of the tail and extremities; the colour of these parts is consequently brown, or reddish brown, with occasional shades of rufous and tawny: the sides of the head, the neck, the throat, breast, and a broad spot on the top of the head, which passes, gradually decreasing in breadth, to the middle of the back, are white, with an obscure tint of Isabella yellow, of different degrees of intensity: this colour also exists, less distinct, in a longitudinal band along the lowest part of the abdomen. From the posterior angle of the eye, a narrow dark brown band passes in a curve towards the throat, and returns again to the posterior part of the ear, where it unites to the lobe. On the forehead, between the eyes, is a transverse band, of a grayish hue, united to an obscure longitudinal streak, which extends along the summit of the head, from the region of the eyes to the crown. The borders of the upper jaw and of the ears are whitish.

The head is rather small and compressed, and the face gradually tapers to an obtuse nose. Both jaws are of equal length; but a slight extension of the naked extremity of the snout gives to the upper jaw the appearance of projecting beyond the lower. The nostrils are pierced anteriorly, but have a small lateral notch. The mustaches consist of a few solitary stiff bristles arising from the upper lip, closely applied to the head, and pointing backward. The eyes, which are rather prominent,

GULO ORIENTALIS.

are situated at an equal distance, between the extremity of the nose, and the ears. The lobes of the ears are larger than in other species of this genus; they are entirely covered with delicate hair; the meatus auditorius is nearly concealed by the covering of the lateral parts of the head, consisting of hairs, long, closely arranged, and somewhat rigid: these extend from the nose backward, and form a very obscure crest on the top of the head between the eyes. The limbs, both anterior and posterior, are slender, and the feet agree in structure with those of the other animals belonging to the first tribe of the Family of Carnivores; the soles are naked, and formed for the plantigrade mode of walking. Each foot is provided with five claws, which are horny, transparent, compressed, curved, and larger on the fore than on the hind feet. They are regular in their dimensions; those of the middle toe are longest; they are somewhat shorter on the index and on the fourth toe, but equal one to the other; on the thumb and small toe they are smallest. The thumb is placed somewhat behind the other toes. Although the claws have considerable resemblance to those of *Mydaus*, and are formed for perforating the ground, they differ in being shorter, more compressed laterally, and more suddenly curved. The tail has nearly half the length of the body; it is somewhat bushy, and terminated by long bristly hairs.

DIMENSIONS.

Length of the body, from the extremity of the nose to the root	
of the tail	1 foot, 4 inches.
..... the head	$3\frac{3}{4}$ do.
..... the tail	6 do.
..... the anterior extremities, from the shoulder to the	
extremities of the toes.....	$4\frac{1}{2}$ do.
..... the posterior extremities	5 do.

This animal is more solitary and more circumscribed in its range than any other of the quadrupeds that have come under my observation in Java. I regret that I had no opportunity of observing it alive. It was obtained during one of my visits to the mountainous tracts in the western provinces of the dominions of the native Princes, by one of my assistants, in the lower adjoining districts. The natives denominate it *Nyentek*, and represent it to be limited in its range to part of the territory South of Mountain Prahū, between the two principal cones of the central part of Java, the Mountain Sumbing, and the Mountain of Teggā, consisting of part of Baggalen and Banyumas, and extending to Gowong in the East. I obtained no notice of it in the Eastern provinces, or in the Priyangan Regencies. Judging from its general structure, as well as from its teeth and claws, it may be supposed to have habits similar to the *Taira* and *Ratel*.



MYDAUS MELICEPS.

Drawn by W. Daniell.

Engraved by W. Taylor.

London, F. & J. Colnaghi, 1834. and J. W. Daniell, 1834. and J. W. Daniell, 1834.

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ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille. Les Carnivores, 1^{re} Tribu, Plantigrades.

ORD. III. FERÆ, *Lynn*. Syst.

ORD. XII. FALCULATA, *Illiger*. Fam. 34, Plantigrada.

MYDAUS, *Fréd. Cuv. Mamm. lithogr.* 27. livrais.

CHARACTER ESSENTIALIS.—*Dentes primores* superiores erecti, inferiorum intermedii procumbentes. *Rostrum* breve conicum, attenuatum in proboscidem brevem obtusam. *Auriculæ* oblongæ villis reconditæ. *Cauda* brevissima. *Glandulæ anales* duo, ad latera caudæ sitæ, ductibus excretoribus in intestino recto terminantibus. *Pedes* plantigradi. *Ungues* falculæ longissimæ, rectiusculæ, subulatæ.

CHARACTER NATURALIS.—*Dentes primores* utrinque sex, supra erecti, æquales, approximati, regulariter in arcum dispositi; infra compressi, intermedii quatuor procumbentes, exteriores, obliqui. *Laniarii* mediocres, læves, compressi; inferiores breves, primoribus exterioribus approximati, consimiliter arcuati. *Molares* supra utrinsecus quatuor; primus minimus (aliis nullus) secundus longiusculus sectorius; tertius (dens carnivorus dictus, *carnassier* Fréd, Cuv.) corona sulco obliquo bipartita, acie exteriori longa sectoria, interiori brevior; quartus tritorius, aciebus quatuor obtusis, rotundatis, oppositis, parte posteriore rotundato, ampliato. Infra utrinsecus quinque; primus parvus; secundus et tertius gradatim majores, singuli acie sectoria; quartus omnium longissimus, angustus, antice aciebus tribus in trigonum dispositis, postice margine interiore aciebus totidem, acutis, mamillaribus, parvis, margine exteriori duabus, majoribus, obtusiusculis; quintus tritorius rotundatus, medio excavatus.

Rostrum calvaria brevius, conicum attenuatum. *Proboscis* brevis, attenuata, obtusa, oblique truncata, margine superiore planiusculo, prominulo. *Nares* terminales, oblongæ, sulcu accessorio minuto laterali. *Oculi* ab extremitate proboscidis remotiusculi. Pupilla circularis. *Aures* oblongæ: concha simplex, villis longis recondita, margine posteriore elevato rotundato, basi meatus auditorii subinvoluta. *Lingua* lævis, papillis minutis sericeis.

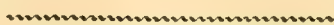
Corpus oblongum, cylindricum, obesusculum, codario et pilis longis densis vestitum. *Cauda* brevissima, villis longioribus circumdata. *Mammæ* apertæ, pectorales quatuor, inguinales duo. *Glandulæ anales* duo maximæ intus rugosæ, latere caudæ juxta intestinum rectum dispositæ, quarum singulæ ductum excretorium cylindricum, intestino recto isto terminantem, habent: quivis ductus medio

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annulo musculari instructus est, cum quo animal ad libitum liquidum fætidissimum in intestinum rectum effundit, et postea, ventris crepitu, ejaculat.

Pedes plantigradi, pentadactyli, fissi. *Plantæ* nudæ. *Ungues* falculæ longissimæ, depressæ, rectiusculæ, subulatæ, subæquales; digiti medii antèrius dispositus, reliquorum gradatim posteriores, pollicis postremus.

AFFINITAS.—Genus inter Melem et Mephitim locum tenet; rostro, unguibusque Mele, glandulis analibus dentiumque numero Mephiti simile: characteribus tamen, ab ambobus diversis gaudet.



Mydaus fuliginosus obsolete cristatus, plaga verticali rhomboidea postice attenuata striga dorsali caudæque apice flavescente-albidis.

Tělëdu, in the language of Java, East of Cheribon.

Sëng-gung, in the language of the Sunda Javanese, spoken in the mountainous districts from Cheribon to Bantam.

Teleggo, of the inhabitants of Sumatra—*Marsden's Hist. of Sumatra*, p. 117.

Mephitis javanensis, *Encycl. Method. Mammalogie*, p. 187, par *M. A. G. Desmarest*, 1820.

Mephitis javanensis, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra. Tr. Linn. Soc. XIII.* p. 251, 1821.

Le Télagon, *Fréd. Cuv. Mamm. lithogr.* 27^e livrais.



THE Tělëdu has a peculiar external character and physiognomy. Although it generally agrees in size with the Pole Cats of Europe and America, the circumstances which influence its appearance are entirely different. The heavy form of the body, as well as the head gradually narrowed to an obtuse point, call to mind the figure of a hog. The shortness and strength of the neck, and the manner of walking, by placing the entire sole of the foot on the ground, contribute further to give to the animal a sluggish appearance. The eyes are placed high in the head, and in their size and disposition have considerable resemblance to those of a hog: the eyelids are rigid, and well provided with eyebrows consisting of minute bristles: the irides are of a dark colour, and the pupil is circular. The ears are nearly concealed by the hairy covering of the body; but these organs are provided externally with an oblong concha, which surrounds the posterior part, and passing the lower extremity of the meatus auditorius, forms a small curve inward. No whiskers are perceptible, but a few long straggling hairs arise from the upper lip. The covering of the Tělëdu is adapted to the elevated and cold regions which it inhabits. The fur is composed of long delicate hairs, silky at the base, which are closely arranged, and afford a very warm coat to the body. On

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the sides of the neck the hairs are lengthened, and have a curved direction upward and backward; on the top of the head, meeting from before and behind, they form a small transverse crest, and on the abdomen they are thinly disposed, and afford in some parts a view of the naked skin. The colour of the hairs is blackish-brown, more or less intense on every part of the body, except the crown of the head, a streak along the back, and the extremity of the tail. These parts are white, with a slight tint of yellow. The mark on the head has a rhomboidal form, obtuse and rounded anteriorly, but gradually attenuated as it passes to the shoulders, where it unites with the streak on the back: in some individuals this streak is interrupted. On the abdomen the brown is of a lighter hue, inclining to grayish or rufous. The covering is subject to several variations: some of the individuals deposited in the Honourable Company's Museum are grayish-brown, others are deep brown with a sooty tint; the last colour, as far as my observation extends, is the most common, and has formed the base of the specific character placed at the head of this article. The tail is scarcely half an inch long, but the hairs covering and surrounding it project above an inch from the body. The limbs are short and stout, and the feet agree in structure with those of the allied genera, being formed for the plantigrade manner of walking. The claws are united at the base by a thick membrane, which envelopes this part as a sheath. Those of the fore feet are nearly double the size of those of the hind feet. In place of the pouches and reservoirs of fetid fluids with which several genera of this family are provided, the *Mydaus* has two glands of an oblong form, about one inch long, and half an inch wide, near the extremity of the rectum: they are placed opposite to each other, and are individually furnished with an excretory duct nearly half an inch long, which communicates with this intestine. In the middle of each duct is a very minute aperture, surrounded by a muscular ring, somewhat swelled, which enables the animal at pleasure to discharge or to retain the fetid fluid secreted by the glands. The ducts enter the rectum about half an inch within the external aperture. The internal surface of these glands is covered with numerous wrinkles disposed transversely. The fluid secreted by them is perfectly analagous, in its odour, to that secreted by several species of *Mephitis* in America, particularly to that of the *Mephitis striata* of Fischer. Having experienced that of the latter, which is known in most parts of North America by the name of Skunk, I readily recognised it in Java.

The *Télédu* is already known to Zoologists. The illustrious Baron Cuvier first noticed it in the *Règne Animal* as a species of *Mephitis*, with which genus it agrees as well in the number of its teeth, as in the apparatus for secreting an intolerably fetid fluid. Mr. Desmarest has introduced it into the article *Mammalogie* in the *Encyclopédie Methodique*, with the specific name of *Javanensis*; this has also been adopted in the *Descriptive Catalogue of a Zoological Collection* made by Sir Stamford Raffles in Sumatra, contained in the XIIIth volume of the *Transactions of the Linnean Society*. Specimens of this animal were brought to France by Mr. Leschenault

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on his return from Java, and were also sent by me to the Museum of the Honourable East India Company, in the year 1812.

The 27th Livraison of the Hist. Nat. des Mammiferes, published by Mr. Fréd. Cuvier, in Paris, contains a figure of our animal under the name of Télagon, communicated to him by Mr. Diard. This figure, drawn from life, suggested to Mr. Cuvier a careful comparison of the Těľdu with several species of Mephitis with which it had been associated. He was enabled to make this comparison by means of the specimens and bony parts of the Těľdu preserved in the Museum in Paris, as well as by a good drawing of the Chinche, the Mephitis dimidiata of Fischer, made by his brother in America, and by the skeletons of Mephitis found in the same collection. He remarks that in physiognomy the Chinche and the Těľdu have nothing in common but the plantigrade manner of placing the foot on the ground; and he has separated the Těľdu into a distinct genus, for which he proposes the name of MYDAUS, while the species, in consequence of the form of the head, is defined by that of *Meliceps*. In illustration of his views, Mr. Cuvier has added several comparative remarks, of which the following is the substance:—"The Chinche-Mephitis dimidiata- has a rounded head, a short pointed, not very broad muzzle, which calls to mind the head of the Fitchet, or rather of the Cat, if the muzzle of this were less obtuse. On the contrary, the head of the Télagon calls to mind the elongate muzzle and snout of the Badger, with a face still narrower. The Chinche further has a large tail, furnished with long, bushy hairs, which it elevates as a plume on its back, in the same manner as Squirrels. The Télagon, on the contrary, is almost deprived of this organ, its tail being scarcely an inch long, and very scantily provided with hairs. The examination of the bony parts further confirms the propriety of separating these animals into distinct genera. The elongation of the head of the Télagon, and the narrowness of its muzzle, are the cause that the grinders are individually more separated from each other, and that the front teeth, instead of being placed nearly in a straight line, are disposed in form of a very small arch or curve. There is also a difference in the relative arrangement of the grinders in the jaw-bones, which affects the communication of the nostrils and the posterior parts of the mouth."

During the examination and arrangement of my notes and collections relating to this subject, I have carefully compared with our animal, a head and preserved skin of the Mephitis dimidiata of Fischer, the Chinche of Buffon, above mentioned. This had been sent to England by Mr. Franklin, from Cumberland House, an establishment of the Hudson's Bay Company on Slave Lake, and was in a very perfect state of preservation. I owe to the kindness of Mr. Joseph Sabine, Secretary to the Horticultural Society, the opportunity of making this comparison. I likewise examined another species of Mephitis contained in the extensive and highly instructive Museum of Mr. Brooks. At the Royal College of Surgeons I was favoured with

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an opportunity of examining a very interesting subject, prepared by Mr. Hunter himself, representing the anal-glands of a species of *Mephitis*, and their situation relatively to the rectum. This forms part of a very instructive series, exhibiting the anal-glands and follicles of various animals of this family, by which a thick fluid is secreted, and which comprises both the *Viverra Zibetha*, which furnishes the odorous civet, and the *Mephitis* and *Mydaus*, whose intolerably fetid exhalations prevent the approach of other animals.

I have represented on the Plate of Illustrations a comparative view of the head, the teeth, the claws, and the anal-glands of the *Mydaus meliceps* from Java, and of a species of *Mephitis*, which genus has hitherto been found only in America. To the most striking differences which have already been cited from the description of Mr. F. Cuvier, it may be proper to add, that the front teeth of *Mephitis*, in both jaws, are very different from those of *Mydaus*. Their peculiarities in the latter have already been detailed in the generic description; those of *Mephitis*, in the upper jaw, are considerably longer and narrower, and in the lower jaw they have a different arrangement, the tooth on each side, next the exterior tooth, being removed somewhat interiorly from the general series. The canine teeth in *Mydaus* are small, compressed, and slightly curved: in *Mephitis* they are long, erect, and sharp, resembling these teeth in *Canis*, *Mustela*, and *Felis*. In the form of the grinders there is a greater resemblance; but the third in the lower jaw, the carnivorous tooth of Mr. Cuvier, exhibits some peculiarities in *Mydaus* which do not exist in *Mephitis*. The claws in *Mydaus* are slightly curved, slender, narrow, both in a vertical and horizontal direction, and formed for a very delicate manner of perforating the ground: in *Mephitis* they are more suddenly curved and vertically compressed, and likewise proportionally shorter. In *Mephitis* the lobes of the ear, though short, appear externally covered with very delicate fur: in *Mydaus* they are nearly concealed from view by the long hairs which cover the neck, and sides of the head.

From the preceding details which exhibit those characters of *Mydaus*, by which it is entitled to be considered a distinct genus, its situation in a natural arrangement does likewise appear. If it differ from *Mephitis* in those points which have been clearly brought into view, particularly in the form of the head and body, in the size and structure of the tail, and in some peculiarities of the front teeth and claws, it agrees with that genus in the structure of the glands, on which the fetid odour, peculiar to both, depends, and in the system of dentition, as far as relates to the grinders generally. In the form of the head and snout, our animal so strikingly resembles the Badger, that Mr. Cuvier has proposed, for specific distinction, the name of *Meliceps*. But it has still other points of affinity to *Meles*. It agrees with that animal in the form of the external ear, and its claws more closely resemble those of a Badger, than those of any other animal with which I have had an opportunity of comparing it. I am unable to determine the affinity between *Mydaus* and *Meles*,

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as far as relates to the anal-glands; but the follicle of the Badger is described as being similarly situated, and as secreting a fluid very similar in consistence, though of a less offensive nature. A striking affinity between *Mydaus* and *Meles* further exists in the slowness of their motions, the clumsy make of their bodies, their nocturnal habits, the mode of constructing their dwellings, their food, and their manners generally: these, as far as relates to *Mydaus*, will be detailed in the sequel. Of the other animals of this family, which is distinguished by the character of *plantigradæ*, it is sufficient to mention the name, to shew that they cannot claim so much affinity to *Mydaus* as the genera with which it has been compared:—they are *Ursus*, *Procyon*, *Nasua*, *Cercoleptes*, and *Gulo*. *Mydaus* should therefore be arranged between *Meles* on one side, and *Mephitis* on the other. This genus, it is true, is placed in the family of *digitigradæ* both by Baron Cuvier and by Mr. Desmarest. By the latter it is even removed beyond *Mustela*, which from its affinity, in many points, to *Gulo*, forms the connecting link between the families of *plantigradæ* and *digitigradæ*. But the character of *Mephitis*, as far as regards this point, appears both from the description of the *Mephitis Mapurito* by Mutis (*Act. Holmiens*, 1770, p. 68), who uses the following expression:—"talis ursorum instar incidentes;" and from the remark of Mr. F. Cuvier, who in comparing the *Chinche* with the *Tělëdu*, asserts that, as far as regards their external appearance, they have nothing in common but their "allure plantigrade."

DIMENSIONS.

Length of the body and head, from the extremity of the nose to the root of the tail.....	1 Foot, $2\frac{3}{4}$ inches.
.....of the naked tail	$\frac{1}{2}$ do.
.....of the tail with its hairy covering.....	2 do.
.....of the head.....	4 do.
.....of the anterior extremities	$3\frac{1}{2}$ do.
.....of the posterior extremities	$4\frac{1}{2}$ do.

The *Mydaus meliceps* presents a singular fact in its geographical distribution. It is confined exclusively to those mountains which have an elevation of more than 7000 feet above the level of the ocean; on these it occurs with the same regularity as many plants. The long-extended surface of Java, abounding with conical points which exceed this elevation, affords many places favourable for its resort. On ascending these mountains, the traveller scarcely fails to meet with our animal, which, from its peculiarities, is universally known to the inhabitants of these elevated tracts; while to those of the plains, it is as strange as an animal from a foreign country. A traveller would inquire in vain for the *Tělëdu* at Batavia, Semarang, or Surabaya. In my visits to the mountainous districts I uniformly met with it, and as far as the information of the natives can be relied on, it is found on all the moun-

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tains. It is, however, more abundant on those which, after reaching a certain elevation, consist of numerous connected horizontal ridges, than on those which terminate in a defined conical peak. Of the former description are the Mountain Prahu and the Tengger Hills, which are both distinctly indicated in Sir Stamford Raffles's Map of Java; here I observed it in great abundance. It was less common on the Mountain Gêde, South of Batavia; on the Mountain Ungarang, South of Semarang; and on the Mountain Ijen, at the farthest eastern extremity; but I traced its range through the whole Island.

Most of these mountains and ridges furnish tracts of considerable extent, fitted for the cultivation of wheat and other European grains. Certain extra-tropical fruits are likewise raised with success: peaches and strawberries grow in considerable abundance, and the common culinary vegetables of Europe are cultivated to great extent. To most Europeans and Chinese, a residence in these elevated regions is extremely desirable; and even the natives, who in general dislike its cold atmosphere, are attracted by the fertility of the soil, and find it an advantage to establish villages, and to clear grounds for culture. Potatoes, cabbages, and many other culinary vegetables are extensively raised, as the entire supply of the plains in these articles depends on these elevated districts. Extensive plantations of wheat and of other European grains, as well as of tobacco, are here found, where rice, the universal product of the plains, refuses to grow. These grounds and plantations are laid out in the deep vegetable mould, where the Tělēdu holds its range as the most ancient inhabitant of the soil. In its rambles in search of food, this animal frequently enters the plantations, and destroys the roots of young plants; in this manner it causes extensive injury, and on the Tengger Hills particularly, where these plantations are more extensive than in other elevated tracts, its visits are much dreaded by the inhabitants: it burrows in the earth with its nose in the same manner as hogs, and in traversing the hills, its nocturnal toils are observed in the morning in small ridges of mould recently turned up.

The Mydaus forms its dwelling at a slight depth beneath the surface, in the black mould, with considerable ingenuity. Having selected a spot, defended above by the roots of a large tree, it constructs a cell or chamber, of a globular form, having a diameter of several feet, the sides of which it makes perfectly smooth and regular; this it provides with a subterraneous conduit or avenue, about six feet in length, the external entrance to which it conceals with twigs and dry leaves. During the day it remains concealed, like a badger in its hole; at night it proceeds in search of its food, which consists of insects and their larvæ, and of worms of every kind: it is particularly fond of the common lumbrici, or earth-worms, which abound in the fertile mould. These animals, agreeably to the information of the natives, live in pairs, and the female produces two or three young at a birth.

The motions of the Mydaus are slow, and it is easily taken by the natives, who by no means fear it. During my abode on the Mountain Prahu, I engaged them

MYDAUS MELICEPS.

to procure me individuals for preparation; and as they received a desirable reward, they brought them to me daily in greater numbers than I could employ. Whenever the natives surprise them suddenly, they prepare them for food; the flesh is then scarcely impregnated with the offensive odour, and is described as very delicious. The animals are generally in excellent condition, as their food abounds in the fertile mould.

The structure of the teeth, as appears from the generic details, affords to the Mydaus but feeble means of defence; the front teeth in the lower jaw have nearly a horizontal position, and the canine teeth are comparatively small and weak. The animal being slow in its motions, its manner of defence is of a negative nature, and, as in the American Mephitis, consists in preventing the approach of an enemy by an intolerably offensive odour: hence these animals have received the names of Mephitis, Mydaus, Stifling Wesel, Bete-puante, &c. The apparatus on which this depends has already been described, and is in part represented on the Plate of Illustrations. The effort by which the fetid matter is projected, is described by the natives as a crepitus ventris: the muscular coat of the glands, as far as I have ascertained, serves only to propel the fluid into the rectum, at the pleasure of the animal: its discharge, as a means of annoyance to its enemies, is effected by a general effort of the abdominal muscles. On the Mountain Prahu, the natives who were most active in supplying me with specimens of the Mydaus, assured me that it could only propel the fluid to the distance of about two feet:—the fetid matter itself is of a viscid nature; its effects depend on its great volatility, and they spread through a great extent; the entire neighbourhood of a village is infected by the odour of an irritated Tělědu, and in the immediate vicinity of the discharge, it is so violent, as in some persons to produce syncope. The various species of Mephitis in America differ from the Mydaus in the capacity of projecting the fetid matter to a greater distance. A detailed account of the Mephitis Mapurito is given by Mr. Mutis, in the 31st Volume of Stockholm Transactions, for the year 1770.

The Mydaus is not ferocious in its manners, and taken young, like the Badger, it might easily be tamed. An individual which I kept some time in confinement, afforded me an opportunity of observing its disposition; it soon became gentle, and reconciled to its situation, and did not at any time emit the offensive fluid. I carried it with me from Mountain Prahu to Blederan, a village on the declivity of that mountain, where the temperature was more moderate. While a drawing was made, the animal was tied to a small stake; it moved about quietly, burrowing the ground with its snout and feet, as if in search of food, without taking notice of the bystanders, or making violent efforts to disengage itself: on earth-worms (*lumbrici*) being brought, it ate voraciously; holding one extremity of a worm with its claws, its teeth were employed in tearing the other: having consumed about ten or twelve, it became drowsy, and making a small groove in the earth, in which it placed its snout, it composed itself deliberately, and was soon sound asleep.



One foot

VIVERRA MUSANGA, (VAR.) JAVANICA.

Drawn by W. Daniell.

Engraved by W. Taylor

London, Published by Black, Kingsbury, Parbury & Allen, Islington Street, July 2, 1851.

VIVERRA MUSANGA,

VAR. JAVANICA.



ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille les Carnivores. 2^{de} Tribu, Digitigrades.

ORD. III. FERÆ, *Linn.* Syst.

ORD. XII. FALCULATA, *Illiger*. Fam. 35, Sanguinaria.

VIVERRA, *Linn. Erxleb. Schreb. Cuv. Geoff. Illig.*

CHARAC. GEN.—*Dentium formula*, *Primores* $\frac{6}{6}$, *Canini* $\frac{1-1}{1-1}$, *Molares* $\frac{6-6}{6-6}$ seu $\frac{5-5}{5-5}$.
Primores utrinque 6 intermedii breviores. *Molares* utrinque 5 aut 6: supra quartus maximus, interius gradu laterali antice auctus; quintus et sextus tritores. Infra quintus, seu quartus primo deficiente, sectorius maximus; sextus tritorius magnus.

Caput elongatum, rhinario prominulo. *Lingua* retrorsum aculeata.

Corpus codario et pilis longioribus vestitum. *Folliculus* inter genitalia et anum.

Pedes pentadactyli fissi. *Ungues*: falculæ semiretractiles.

Sect. II. Genettæ II^{de} sous-genre les Genettes.

Follicules reduced to a simple excavation.



Viverra corpore nigro et cinereo variegato, dorso obsolete striato, capite pedibus caudaque nigris, fascia frontali per aures ad latera colli oblique producta rhinarii que basi albentibus.

Luwak, of the Javanese.

Musang-bulan, of the Malays.

Viverra Musanga, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra. Tr. Linn. Soc. XIII. p. 253.*

Musang, Marsden's Hist. of Sumatra, p. 118.



THE Viverra Musanga so nearly resembles the Viverra Genetta in size, colour, and distribution of marks, that it has by several authors been described under that name. It constitutes, however, a distinct species, which is itself subject to several varieties. Its appearance in Java is here represented from an adult subject in a very perfect state, and of a full size. Its dimensions are as follow:

VIVERRA MUSANGA.

Length of the body and head, from the extremity of the nose to		
the root of the tail.....	1 Foot,	10 inches.
..... the tail	1 do.	6 do.
..... the head	6 do.	
..... the anterior extremities	6 do.	
..... the posterior extremities	7 do	

DESCRIPTION.—Head black, with a whitish-gray stripe, commencing near the inner angle of the eye, gradually increasing in breadth, and passing across the ears to the sides of the neck. Extreme point of the muzzle, surrounding the base of the nose, whitish. Body and anterior parts of the neck and breast, variegated gray and black, slightly inclining to tawny, very obscurely striated. Legs and tail black, or deep brown. Nose prominent at the extremity, and deeply furrowed. Ears short and rounded, provided with a very small anterior lobule. Bristles stiff and horny at the base, arising numerous and of great length from the upper lip posteriorly, singly and short above the eyes, and near the angle of the mouth. Eyes rather prominent, pupil round, irides dark. Limbs rather short and robust. Claws large, strong, prominent, and scarcely retractile. Soles of the feet naked. Tail nearly the length of the body, very gradually tapering to the point, covered with long, coarse hair. Fur composed of hair somewhat stiff and bristly, not closely applied to the skin. Hair variegated, gray at the base, with longer or shorter black points, or entirely black, liable to vary with the age of the animal, whence results the difference in the marks of young and of adult subjects.

In the most common variety of Java, the *Viverra Musanga* is of a much lighter grayish colour: three distinct longitudinal stripes appear on the back, and two somewhat paler on the sides. The white colour bordering the base of the nose, is much more extensive, shewing itself also under the eye, and at the extremity of the lower jaw. These marks, with the white extremity of the tail, an inch or two in length, appear to be permanent.

In Sumatra the Musang assumes, agreeably to the description of Sir T. S. Raffles, illustrated by a specimen deposited in the Museum of the Honourable East India Company, a dusky fulvous colour, and the point of the tail is uniformly white. The stripes on the back and sides are more distinct than in the dark Javanese variety. The same appearances are exhibited on the figure in Mr. Marsden's *Hist. of Sumatra*, p. 118. Pl. XII. No. 2.

The teeth agree in the specimens from both Islands. The incisors present nothing peculiar. The canines are long, and slightly grooved. The molars are

VIVERRA MUSANGA.

limited to the number of five in each jaw : the three foremost in the upper jaw are conical and rather short; the fourth is largest, and agrees with the description contained in the generic character; the fifth is proportionally large, and formed for grinding. In the lower jaw, the three first are conical, the fourth corresponds to the fifth in other species, and the fifth is very large, and marked with three ridges of tubercles. The shortness and comparative breadth of all the molars indicate their being calculated chiefly for vegetable food.

Of the various Indian species of *Viverra*, described in the *Encyclopédie méthodique*, under the article *Mammalogie*, by M. A. G. Desmarest, the first part of which was published in 1820, the *Viverra fasciata* is most nearly allied to the *Musanga*; the whitish extremity of the muzzle, of the band extending from the forehead over the eye through the ear, and the lines on the back and sides, are similar; but the body is of a yellowish colour, while the feet and the extremity of the tail are deep brown. The *Viverra nigra*, recently sent from India by Mr. Leschenault de Latour, has also various points of agreement with our species.

The manners and habits of the *Viverra Musanga* are very similar to those of the Genet. If taken while young, it becomes patient and gentle during confinement, and receives readily animal and vegetable food. It requires little attention, and even contents itself with the scanty remains of the meals of the natives, with fish, eggs, rice, potatoes, &c. the structure of its teeth being particularly adapted to a vegetable diet. It prefers, however, delicate and pulpy fruits; but, when pressed by hunger, also attacks fowls and birds.

It is most abundant near the villages situated at the confines of large forests. It constructs a simple nest in the manner of Squirrels, of dry leaves, grass, or small twigs, in the forks of large branches, or in the hollows of trees. From these it sallies forth at night to visit the sheds and hen-roosts of the natives, in search of eggs, chickens, &c. Its rambles are also particularly directed to the gardens and plantations, where fruits of every description within its reach, and particularly pine-apples, suffer extensively from its depredations.

The coffee plantations in Java are greatly infested by the *Viverra Musanga*; in some parts of the Island it has on this account obtained the name of Coffee-rat. It devours the berries in large quantities, and its visits are soon discovered by parcels of seeds which it discharges unchanged. It selects only the ripest and most perfect fruits, and the seeds are eagerly collected by the natives, as the coffee is thus obtained without the tedious process of removing its membranaceous arillus.

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The injurious effects occasioned by the ravages of the Luwak in the coffee plantations are, however, fully counterbalanced by its propagating the plant in various parts of the forests, and particularly on the declivities of the fertile hills: these spontaneous groves of a valuable fruit in various parts of the western districts of Java, afford to the natives no inconsiderable harvest, while the accidental discovery of them surprises and delights the traveller in the most sequestered parts of the Island.

VIVERRA RASSE.



ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille. Les Carnivores.

2^{de} Tribu, Digitigrades.

ORD. III. FERÆ, *Linn. Syst.*

ORD. XII. FALCULATA, *Illiger*. Fam. 36, Gracilia.

VIVERRÆ *subgenus primum* (VIVERRA) *Cuvier, Règn. anim. I. p. 156.*

VIVERRÆ SPECIES, *auctorum.*

CHAR. GEN.—*Dentes primores* utrinque sex, in eadem serie collocati. *Laniarii* distincti, primoribus multo longiores, conici. *Molares* supra utrinsecus sex; antici tres sectorii, compressi, basi gradibus obsoletioribus in posterioribus gradatim majoribus aucti, quartus maximus, acie una elongata, antice gradu abbreviato, postice gradu emarginato et interius processu laterali magno sectorio auctus, quintus et sextus transversi, tritores, tuberculis prominulis. Infra utrinsecus sex, primus minimus, secundus, tertius, et quartus gradatim majores, gradibus basilaribus obsoletioribus, in tertio et quarto postice bifidis magis prominulis, aucti; quintus maximus quadricuspidatus, aciebus duabus externis sectoriis, posteriore longissima compressa, tertia interiore, quarta abrupte breviora posteriore; sextus minor compressus, tritorius, tuberculis prominulis attenuatis.

Rostrum acutiusculum, rhinario prominulo obtuso. *Lingua* retrorsum aculeata.

Pupilla transversa. *Auriculæ* rotundatæ.

Corpus codario et pilis longioribus vestitum. *Cauda* longa. *Mammæ* apertæ. *Folliculus* maximus, ovato-oblongus, depressus, utrinque dilatatus, subbipartitus, inter anum et genitalia situs, glandulosus, liquidum odoriferum secernens, rima longitudinali aperiens.

Pedes distincti ambulatorii, digitigradi, pentadactyli, fissi. *Plantæ* pilosæ. *Ungues*: falculæ acutæ, semivaginatæ, semiretractiles.



VIVERRA RASSE.

Viverra griseo-fulvescens, auriculis subapproximatis, dorso lineis octo longitudinalibus parallelis nigricantibus vario, collo fasciis obscuris, pedibus concoloribus fuscis, pilis corporis caudæque attenuatæ rigidiusculis.

Rasse, of the Javanese.

THE *Viverra Rasse* is at once distinguished from the other species of this genus, by its lengthened form, and by the slenderness of all its parts. The head is laterally compressed, elevated from the jaws to the crown, and regularly and uniformly attenuated to the muzzle. The position of the ears affords a peculiar physiognomy to our animal: they approach each other on the forehead, in consequence of the narrowness of the head; the auricle rises to a considerable height with a curve, and then suddenly declines to the sides; but its margin is generally reflected, and thus this character, as is the case in our figure, does not appear in its full extent. Near the base the auricle has posteriorly a duplication or fold corresponding to an antitragus, and is provided, opposite to the base, with a tragus of considerable extent. The internal ear has several naked transverse membranes, leading to the meatus auditorius; but it is concealed from view by a decumbent series of stiff hairs, which extend into the ear from the sides of the head. The eyes are of moderate size, prominent, and have a dark iris; before the interior canthus, a considerable cavity exists in the face. The muzzle is long, defined above by a regular line, and terminated by a short naked nose with lateral nostrils. The whiskers consist of several stiff hairs of great length, closely applied to the head, differing as to colour, being either entirely white or entirely black. A few solitary bristles are also scattered over the chin and cheeks. The teeth agree precisely with those of the *Viverra Zibetha*: the canine teeth are long and slightly arched; the points of the false and true grinders are acute and elevated. The front teeth are disposed in a regular series. Both jaws are of equal length. The form of the neck and of the body is slender and cylindrical. The tail is of small diameter at its origin, and regularly attenuated to the point. The anterior extremities are slender; of the posterior extremities the thighs are stout, but the legs and feet are delicate. The *Rasse* belongs to the division of strictly *digitigrade* Carnassiers. The claws are sharp and semiretractile. In the number and distribution of the toes the *Rasse* agrees with the other species of *Viverra*, and with *Genetta* and *Musanga*.

The apparatus by which the odoriferous substance, the *dedes* or *jibet* of the Javanese and Malays, is secreted, consists of a glandular body, of an oval form, slightly compressed, having in its external surface considerable resemblance to a nut-

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meg. The diameter is about three-fourths of an inch. It is situated in contact with, and a little before the anus, and is provided externally, with a longitudinal aperture, or rima, half an inch in length, capable of contraction, and partially concealed by the hairy covering: this passes directly into the glandular apparatus, constituting an extensive surface, on which the secreted odoriferous substance is deposited: the sides are covered with numerous papillæ.

The covering of the Rasse consists of rigid hairs of considerable length, supplied with a downy appendage at the base. The general colour is gray, of a tawny hue, variegated with lines and spots, dark brown, inclining to black, of different degrees of intensity on different parts. The distinguishing character of our animal is afforded by eight lines of a dark brown colour, extending longitudinally from the shoulders to the root of the tail. The intermediate lines are continued and regular; the exterior lines, on each side, are slightly interrupted, and the brown colour is variegated with lighter shades of tawny. On the sides of the body the marks consist of several interrupted lines, which are also observed on the shoulders and on the thighs. The head above, and the upper parts of the neck, are covered uniformly with hair, banded alternately with tawny and brown, which gives these parts a variegated appearance. A black spot marks the anterior canthus of the eye and the base of the ears; the extremity of the auricle is gray externally; several small tufts of whitish hairs are dispersed over its internal surface. On the lips, the cheeks, and the under side of the neck the colour is lighter, and has a grayish tint, but slightly diversified with tawny. A longitudinal line extends, along the sides of the neck, from the ears towards the shoulders: anteriorly the neck is marked with several transverse bands; two of these have an oblique direction, and, inclining towards each other, mark the neck with a figure resembling the letter Y. The lower portion of all the extremities, the breast, and the inner side of the thighs have a saturated blackish brown tint, with an obscure reddish lustre; the abdomen, underneath, is blackish gray, with a tawny hue. The tail has eight rings, of a blackish colour; the intermediate rings are gray, and the colour becomes gradually more diluted, and whitish towards the extremity. In young subjects the tawny tint predominates generally over the gray, and the lines and bands are obscurely marked.

In the characters which belong to the genus *Viverra*, as now defined, the *Viverra Rasse* agrees strictly with the *Viverra Civetta* and *V. Zibetha*: the great elongation of the points of the teeth, as well as the glandular apparatus for secreting the civet, affords a character to distinguish these animals from the *Genettæ*; and in the employment of this genus, I have followed the division established by M. Cuvier, in the *Regne animal*, I. p. 156.

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The entire length of our animal, from the end of the muzzle to the root of the tail, is one foot and eleven inches: the head measures five inches and one-fourth, and the tail twelve inches; the distance between the ears, at the base, is ten lines. A very perfect specimen of the *Viverra Zibetha*, the *Tanggalung* of the Malays, forwarded from Sumatra by Sir Stamford Raffles, affords the means of shewing more distinctly the peculiarities of the *Rasse*, by a careful comparison. The *Tanggalung* is two feet six inches long; the head measures six inches and three-fourths, and the tail eleven inches. The space between the ears is two inches. The proportions of the parts of the body of the two species are very different. The *Viverra Zibetha* is comparatively a stout animal; the neck is short and thick, and the breast full and distended. The head, which in the *Rasse* is regularly attenuated, in form of a wedge, in the *Tanggalung* is swelled, rounded and bulging before the ears, and then very abruptly contracted to a short muzzle. The ears are ten lines distant in the *Rasse*, and two inches in the *Zibetha*; this character gives a very different physiognomy to the two animals. The tail is nearly cylindrical in the *Tanggalung*; in the *Rasse* it is regularly and uniformly attenuated to a point. In the hairy covering, or fur, these two animals are essentially different; while it is rigid, coarse, and rather scantily disposed in the *Rasse*, it is close, soft to the touch, and provided with much down at the base in the *Tanggalung*, and its thickness affords a peculiarity to the tail of the latter.

I shall now concisely enumerate the distinctions afforded by the external marks. The *Viverra Zibetha* has a single black line, of considerable breadth, in the highest part of the back, bounded on each side by a white line; exterior to this is an interrupted line of a dark colour, while the rest of the back and sides is covered with smaller spots, disposed in such a manner as to give the appearance to these parts of being transversely undulated. In the *Rasse* eight regular parallel lines are clearly distinguishable. The upper parts of the head and neck present no difference in these two animals; but the marks on the lateral and anterior parts of the neck are very dark in the *Zibetha*, while they are faint and indistinct in the *Rasse*. The rings are strongly marked, and pass uniformly around the tail in the *Rasse*; in the *Viverra Zibetha* they are irregularly defined, and scarcely perceptible on the under side of the tail.

The name *RASSE*, like many other Javanese names, is derived from the Sanskrit language; and it is therefore entitled to be employed as a specific name, with the same propriety as *Civetta* and *Zibetha*, which are derived from the Arabic. *Rasse*, as employed by the Javanese, is a modification of *RASA*, and is applied to our animal as producing an odoriferous substance. In the original, *Rasa* has various significations, of which flavour or taste appears to be the primary meaning; the others also relate chiefly

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to the senses, or to emotions that arise from them; fluids or juices are comprised among its meanings, and many applications of the word *Rasa* and its compounds, to odoriferous substances, perfumes, &c. might be adduced.

The *Viverra Rasse* supplies in Java, the place which the *Viverra Civetta* holds in Africa, and the *Viverra Zibetha* on the Asiatic continent, from Arabia to Malabar, and in the large Islands of the Indian Archipelago. I have endeavoured to shew that, by its form and marks, it is essentially distinct from the *Viverra Zibetha*; and it differs as much in its natural disposition as in external characters. The *Viverra Zibetha* is an animal comparatively of a mild disposition; it is often found among the Arabs and Malays, which inhabit the maritime parts of Borneo, Macassar, and other Islands, in a state of partial domestication, and, by the account of the natives, becomes reconciled to its confinement, and in habits, and degree of tameness, resembles the common domestic cat. The *Rasse*, on the contrary, preserves in confinement the natural ferocity of its disposition undiminished. As the perfume is greatly valued by the natives, it is frequently kept in cages; but as far as I have observed, must always be obtained for this purpose from a wild state, never propagating in a state of confinement.

The *Rasse* is not unfrequently found in Java, in forests of a moderate elevation above the level of the ocean. Here it preys on small birds and animals of every description. It possesses the sanguinary appetite of animals of this family in a high degree; and the structure of its teeth corresponds strictly with the habits and modes of life. In confinement it will devour a mixed diet, and is fed on eggs, fish, flesh, and rice. Salt is reported by the natives to be a poison to it. The odoriferous substance, the *dedes* of the Javanese, or *jibet* of the Malays, is collected periodically; the animal is placed in a narrow cage, in which the head and anterior extremities are confined: the posterior parts are then easily secured, while the civet is removed with a simple spatula.

The substance obtained from the *Rasse* agrees with the civet afforded by the *Viverra Civetta* and *Zibetha*, in colour, consistence, and odour. It is a very favourite perfume among the Javanese, and applied both to their dresses, and by means of various unguents and mixtures of flowers, to their persons. Even the apartments and the furniture of the natives of rank are generally scented with it to such a degree as to be offensive to Europeans; and at their feasts and public processions the air is widely filled with this odour.



6 Inches

MANGUSTA JAVANICA.

Drawn by W. Daniell.

Engraved by W. Taylor.

MANGUSTA JAVANICA.



ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille. Les Carnivores. 2^{de} Tribu,
Digitigrades.

ORD. III. FERÆ, *Linn.* Syst.

ORD. XII. FALCULATA, *Illiger*. Fam. 36, Gracilia.

MANGUSTA, *Olivier*, *Nouv. Dict. d'Hist. Nat.* 1^{re} Ed.

VIVERRA, }
MUSTELA, } *Linn. Erxleb. &c.*

ICHNEUMON, *Lacép. Geoffr.*

HERPESTES, *Illig. Desm.*

CHAR. GEN.—*Dentes primores* utrinque sex, superiorum extimus subelongatus, oblique truncatus, attritu inferioris interne transverse sulcatus, inferiorum extimus major, secundus angustior, basi interior. *Laniarii* supra distincti, erecti, longiusculi, conici, acuti; infra subarcuati, basi incrassati. *Molares* supra utrinsecus sex, aut quibusdam speciebus, primo caduco, quinque; antici tres sectorii, compressi, basi gradibus obsoletioribus in posterioribus gradatim majoribus aucti, quartus maximus, acie una elongata, antice gradu simplici, postice gradu emarginato et interius processu laterali magno sectorio auctus, quintus et sextus transversi, tritores, tuberculis prominulis. Infra utrinsecus sex, (aut aliis adultis quinque) primus minimus, secundus, tertius, et quartus gradatim majores, gradibus basilaribus obsoletioribus, in quarto postice bifido magis prominulo, aucti; quintus maximus quadricuspidatus, aciebus duabus externis sectoriis, posteriore longissima compressa, tertia interiore, quarta abrupte brevior posteriore; sextus minor compressus, tritorius, tuberculis prominulis attenuatis.

Rostrum acutum. *Nasus* productus rhinario rotundato. *Lingua* papillis duris aspersa.

Oculi membrana nictitante. *Pupilla* oblonga. *Auriculæ* breves adpressæ.

Corpus codario et pilis longioribus vestitum. *Cauda* longa, e basi crassa sensim angustata. *Mammæ* apertæ.*Folliculus* glandulosus inter anum et caudam.

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Pedes distincti ambulatorii, digitigradi pentadactyli semipalmati. *Plantæ* nudiusculæ, at incessus in digitis. *Ungues*: falculæ acutæ.

Mangusta fusco-nigricans, nitore glaucino undulata tæniolisque fulvo-cinereis variegata, capite dorso pedibusque saturationibus, cauda attenuata apice simplici acuta.

Garangan, of the Javanese.

Serpenticida, seu Moncus. *Rumphii Herbar. Amboin. auct. p. 69, t. 28, f. 2. 3.*

Ichneumon javanicus, La Mangouste de Java, *Geoffr. Descript. de l'Egypte, Mem. d'Hist. Nat. tom. 2, p. 138, N. 5.*

Herpestes javanicus, *Encycl. Method. Mammalog. p. 212, Par M. A. G. Desmarest, 1820.*

Mangouste de Java, *Fréd. Cuv. Mamm. lithogr. 25^{me} livraison.*

Of the various names which have been introduced into the systematic catalogues, since the animals arranged by Linnæus in the genus *Viverra*, have been distributed into several distinct genera, I have selected that of Olivier, which was first given to the Egyptian Mangusta. The name of *Ichneumon*, originally applied by Lacépède, and afterwards sanctioned by the authority of Geoffroy, would doubtless be more appropriate, had it not previously been employed in Entomology; and it may be presumed that for this reason it was not adopted by Olivier and by Illiger. The latter has applied to this genus the name of *Herpestes*; but this had been selected by Gærtner, to distinguish a genus of plants, several years before the publication of Illiger's *Prodromus*; and having been adopted by several Botanists of the first eminence, it must be considered as established in this branch of Natural History.

In describing the *Mangusta javanica*, I shall first concisely enumerate those characters which apply generally to all the species; the comprehensive observations of M. Geoffroy, in describing the Egyptian Mangusta, will direct me in this enumeration.

The skull agrees generally in form with that of the genus *Viverra*; a name which I propose to limit in this description to two species only, the *Viverra Zibetha*,

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and the *Viverra Civetta* of Linnæus. It displays strongly the character of an animal devoted to the chase. The sagittal and occipital sutures are in a slight degree more elevated than in *Viverra*; the skull is likewise somewhat more distended or inflated posteriorly, and truncated in a more vertical manner. The forehead is rather lengthened, and the posterior portion of the mastoid process of the temporal bone has an oval swelling or enlargement, which is not observed in *Viverra*, but which exists, according to the observation of M. Geoffroy, in several of the *Mustelæ*. In the interior of the skull, the osseous tentorium cerebelli is very extensive. The orbit of the eye is complete posteriorly. The lower jaw, at the juncture of the two lateral portions, is much more strong and robust than in the other genera of this family, with which I have compared it.

The teeth offer the following particulars. The front teeth in the upper jaw are arranged with perfect regularity, but the outer tooth on each side exceeds the others both in length and breadth, and tends to an oblique point; on its internal surface, an oblique groove is formed by the attrition of the corresponding tooth in the lower jaw. The canine teeth are long, conical, and erect. There are six grinders, the three anterior of which are greatly compressed, and constitute false grinders. The first tooth is very minute, and often wanting; it has posteriorly an obscure additional heel; in the second and third the heel appears anteriorly and posteriorly, and the latter is further provided with an interior acuminate tubercle. The fourth tooth is very large, and being broad anteriorly, and narrow behind, it leaves an extensive triangular vacancy, fitted for the reception of the longest point of the fifth grinder of the lower jaw; along its outer margin is one high projecting point with a small single anterior, and a double posterior tubercle; it is further provided with a very large heel projecting far internally, and terminated by a sharp point of considerable length. The triangular space remaining between the fourth grinder and the posterior teeth furnishes an example of the peculiar provision in many carnivorous animals for most effectual mastication, and also of the propriety of denominating this tooth, the carnivorous tooth, in distinction from the anterior false grinders, and the posterior tuberculous teeth. The fifth and sixth grinders are transversely disposed, narrow, and provided with several tubercles. Their points are, on the whole, more acute and elevated than in the teeth of other animals of this family.

In the lower jaw the outer front teeth exceed the others in breadth; the next adjoining teeth diverge internally from the general series, and the intermediate teeth are narrower and shorter. The canine teeth are conical, slightly arched, somewhat swelled at the base, but without any projecting ridge. The four anterior grinders are compressed and successively larger. The first, as in the upper jaw, is sometimes

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wanting in adult subjects; the second and third have a small anterior, and a larger posterior heel; and the fourth is more distended behind, and provided with two tubercles. In the character of the fifth grinder, the genus *Mangusta* is evidently distinguished from the genera with which it is connected by the relations of affinity—the genera *Viverra* and *Ryzæna*; at the same time, it is obvious that the teeth generally are greatly compressed, and the anterior and posterior tubercles more developed than in *Viverra*. This peculiarity produces a strong analogy to the *Felis gracilis*, of the First Number of these Researches, which will be pointed out in the sequel. This grinder greatly exceeds the others in size: it is provided with three high projecting points, two of which occupy the anterior and external, and a third the middle and interior portion of the tooth; of the former, the second is sharp, greatly projecting, and terminated exteriorly by a curved edge; the interior point is acute, simple, and lower: the posterior part of the tooth consists of an abruptly abbreviated heel, formed for trituration, and directed to the sixth grinder, which is a small narrow tuberculous tooth provided with three distinct points. The head is conical, of moderate length, slightly depressed above, and terminated by an acute muzzle, which projects somewhat beyond the lower lip. The tongue is covered with long, sharp, horny tubercles. The eyes are provided with a nictitating membrane, which admits of being drawn entirely over them. The ears are naked and membranaceous internally, and provided with a narrow reflected auricle. Both the body and the neck have a slender form. The hairy covering is long on the body and tail, but short on the head and extremities: it is rigid and glossy, closely applied to the parts which it covers, and provided scantily at the base with a delicate down. The tail, in most species, equals the body in length: it is thick at the root, and gradually attenuated to a point. A very extensive pouch exists between the root of the tail and the organs of generation: it is formed by the common integuments being greatly distended, and disposed in folds, so as to pass over the anal aperture, and to cover it entirely.

The *Mangusta javanica* belongs to the digitigrade animals, and its extremities are proportionally short. The feet are semipalmate, and provided both on the anterior and posterior extremities with five short compressed toes. Of these the two intermediate ones project beyond the small toe and the index, which are nearly of equal length, while the interior toe or thumb is so far removed from the other toes, as to be apparently of little use to the animal. The claws are of moderate length, greatly compressed, slightly curved, acute, fitted, agreeably to the habits of the animal, both for seizing its prey, and for burrowing the ground; and, excepting that of the thumb, which is smaller, vary but little in size. The soles of the feet, and the adjoining inferior portion of the legs, are naked.

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After the preceding observations, which are founded on a general survey of all the species hitherto discovered, a few concise statements are still required to illustrate the history of the Javanese Mangusta. The external form of the body and head, and the proportion of the extremities, are in complete agreement with those of the other Mangustæ. The tail is very robust at the root, and gradually attenuated to a point. This character shews itself strongly in my drawings and specimens. The specific character of *M. Desmarest*, as far as regards the tail, does not strictly apply to our species, and in *Seba's* figure, the tail is also represented cylindrical: I have therefore not admitted it as a synonyme; it also differs in other points. The eyes are disposed far anteriorly in the head, and the irides are reddish brown. The form and structure of the external ear require a few remarks. This organ more nearly resembles the human ear than that of any other animal of this order: with a slight distortion of parts, it affords an accurate representation of it; and all the divisions which have been named by anatomists, can be pointed out. The helix is narrow, linear-oblong, somewhat obliquely disposed, and closely applied to the head: the antihelix runs parallel to it, and is regular and distinct. The upper extremity of the helix is united to a membrane which, after a slight curve, passes transversely across the ear in a direction towards the antihelix: parallel to this is another membrane, of somewhat larger dimensions, representing the segment of a circle, which passes transversely across the ear in the same direction. Below this a naked, depressed process of considerable extent stretches boldly into the ear, being analogous in situation and direction to that part which, in the human ear, is called the concha, a name which in too large a sense is applied to the entire auricle in quadrupeds. At the exterior and lower angle of this, the marginal eminence surrounding the ear rises again, and constitutes an obscure tragus that passes in a narrow border circularly round the ear, to be united on the opposite side to an equally obscure antitragus, which is immediately connected with the antihelix. Between the tragus and antitragus the naked margin affords a slight indication of the lobule: at the lower extremity of this, but concealed from view, the meatus auditorius is disposed. An accurate representation of all these parts, conformable to this description, on which the separate parts are indicated by letters, is given in the Plate of Illustrations, to which I beg leave to refer.

The pouch situated between the organs of generation and the tail, which affords a distinguishing character to this genus, is very extensive in our animal, and agrees closely with the general description above given.

The Javanese Mangusta is chiefly distinguished from the other Indian species, and particularly from the Mangouste de Malacca, of *M. Fréd. Cuvier*, by its darker

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colour. A ground of deep brown, passing, with obscure undulations, into black, is variegated with very numerous short longitudinal lines of a tawny colour. This appearance, which is characteristic of all *Mangustæ*, is produced by alternate bands of tawny and brown, of different shades, passing into black, on the separate hairs. The tint is uniform on the whole surface, excepting the upper parts of the head, the forehead, the muzzle, and the feet, which are dark brown inclining to black, with obscure tawny variegations. The upper parts of the back are more intensely coloured, and the under parts throughout are scarcely perceptibly lighter. The separate hairs are stiff and somewhat bristly, but closely applied to the body. In their disposition some peculiarities occur, which are distinctly represented in the figure. A broad tuft of long delicate hairs passes from the temples over the ears, and affords a substantial covering and protection to the auditory passage; on the anterior parts of the throat, the hairs are regularly directed anteriorly and posteriorly from one point, and spread in a radiated manner. The helix is covered with a very short down. On the upper lip a few stiff bristles of a black colour, nearly an inch in length, are loosely dispersed. The claws are of a brown colour, with a darker tint inclining to black along the upper margin.

The *Mangusta javanica* is distinguished by the native name of GARANGAN. In its habits and manners it resembles the other *Mangustæ* which have been described in detail by various authors. M. Geoffroy had an opportunity of observing and studying the Egyptian species, both in its native country and in Europe; and M. Fréd. Cuvier has given the history of the *Mangouste de Malacca*, as he observed it in the Menagerie of Paris.

The *Mangusta javanica* is found most abundant in the large teak forests. Its agility is greatly admired by the natives. It attacks and kills serpents with excessive boldness. The account which the venerable Rumphius gives of this animal, contains various particulars of its history. I shall extract a portion in his own words. “*Maxima virtus et officium quod hominibus prestat, est, quod serpentes occidat, quem in finem Magnates Javani eum maxime educant, et pro quibus octo vel decem nummos imperiales solvunt, ut aliquando ludibrium hujus pugnae videant, quæ sequenti fit modo. Bini hostes sibi mutuo quum obvii sint, primo tentat anguis more suo Mustelam circumvolvere et enecare. Moncus hoc sibi permittit, sed sese adeo inflat, ut turgeat, quumque serpens eum complectitur, suoque capite ad eum accedit, ut morsum ipsi adferat, tum Moncus corpus suum contrahit, ita ut elabatur, at serpentis collum arrodit, ejusque fauces jugulat.*”—In referring to my notes, I observe that the mode of attack of the Garangan was stated to me by the natives precisely as it is related by Rumphius; but the story regarding

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the antidote which is afforded by the *Ophioxylum serpentinum* to an animal which may have been wounded in the combat, was not reported to me. It is one of those stories which, being founded on superficial observation, has too readily been credited and copied from one writer to another.

The *Mangusta javanica* is very expert in burrowing the ground, which process it employs ingeniously in the pursuit of rats. It possesses great natural sagacity; and from the peculiarities of its character, it willingly seeks the protection of man. It is readily tamed; and in a domestic state it is docile, and attached to its master, whom it follows like a dog; it is fond of caresses, and frequently places itself erect on its hind legs, regarding every thing that passes with great attention. It is of a very restless disposition, and always carries its food to the most retired place in which it is kept, to consume it. It is very cleanly in its habits. It is exclusively carnivorous, and very destructive to poultry, employing great artifice in the surprising of chickens. For this reason it is rarely found in a domestic state among the natives; as one of their principal articles of food is the common fowl, and great quantities are reared in all the villages. The Javanese also, like Mahomedans in general, have a great partiality for Cats, and they are unwilling, in most cases, to be deprived of their society, for the purpose of introducing the *Garangan*. It has also been observed that its sanguinary character shews itself occasionally in a manner that renders it dangerous in a family as a domestic animal; and it indulges, at intervals, in fits of excessive violence.

In the history of this genus, the result of the researches of Naturalists in recent periods, both in increasing the number, and in defining the characters of quadrupeds, is favourably illustrated. In the twelfth Edition of the *Systema Naturæ*, one species only of *Mangusta* is given, with the name of *Viverra Ichneumon*, by Linnæus. In the works of Buffon, the *Ichneumon mungo* of Geoffroy is described with the name of *Mangouste de l'Inde*; two other species are designated with the name of *Nems* (*Ichneumon griseus* Geoffr.), and *La grande Mangouste* (*Ichneumon major*, Geoffr.) and the *Ichneumon galera* Geoffr. has received the name of *Vansire*. Edwards added one species, the *Ichneumon Edwardsii* of Geoffroy; and Schreber, after this period directed his attention to the *Mangustæ*, and has made some improvement in defining the species. But we are indebted to M. Geoffroy for having fixed, with all the precision which the materials hitherto collected admit, the characters of eight species. The researches of M. Fréd. Cuvier have contributed to illustrate the history of several of these, and he has added to the number enumerated by M. Geoffroy, the *Mangouste de Malacca*. He states, that having separated those species which possess strongly marked characters, namely, the

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Ichneumon Pharaonis, the Ichneumon major, the Ichneumon griseus, and the Ichneumon mungo of Geoffroy, there still remain five species, which differ only by insensible modifications of gray and brown; and when they are brought together, and arranged in a series, agreeably to the nearest resemblance of colour, they appear to constitute mere varieties, while those at each extremity of such a series, are so dissimilar, that they must be considered as distinct species. This indeterminate series, as it is denominated by M. Fréd. Cuvier, comprises the Mangusta Edwardsii, the Mangusta galera, the Mangusta rubra, the Mangusta javanica, of Geoffroy, and the Mangusta Malaccensis of Fréd Cuvier. The Mangusta javanica exhibits the extreme darkness of colour among these, when contrasted with that from Malacca, the latter being of a grayish colour, while the former is dark brown, inclining to black. The Mangusta Edwardsii is only known by his figure and description; the Mangusta galera, or Vansire, has been observed in the Menagerie of Paris; and the Mangusta rubra is contained in the collections of the Museum at Paris. In the definition of these species, great accuracy has been displayed by M.M. Geoffroy, and Fréd. Cuvier.

The genus Viverra comprised in the year 1766, when Linnaeus published the twelfth Edition of the Systema Naturæ, *six* animals: 1, the Ichneumon, Viverra Ichneumon; 2, the brown Coati; and 3, the rufous Coati, Viverra Narica, and Viverra Nasua; 4, the American Pole-cat or Skunk, Viverra putorius; 5, the Musk animal or Zibeth, Viverra Zibetha; and 6, the Genet, Viverra Genetta. In the year 1788, Gmelin arranged under this genus *twenty-six* animals, which at the present period are distributed into two families, each comprising several genera, distinguished by clear and obvious characters. Of the various animals which Gmelin brought together, the Viverra Ichneumon, Mungo, and Cafra belong to the genus *Ichneumon*, as first defined by Lacépède; the *Mangusta* of Olivier; the Viverra tetradactyla, from which the *Zenik* appears to differ only in name, constitutes the genus *Suricata* of Desmarest, or *Ryzæna* of Illiger; the Viverra Nasua and Viverra Narica are the only discovered species of the genus *Nasua*, first defined by Storr; the Viverra Putorius, Mephitis, and several others, constitute the genus *Mephitis* of M. Georges Cuvier; the Viverra Zorilla is placed in the genus *Mustela*, by Desmarest; the Viverra caudivolvula forms the genus *Potos* of Geoffroy, or *Cercoleptes* of Illiger; the Viverra mellivora and Viverra vittata belong to the genus *Gulo* of Storr; the Viverra Civetta and Viverra Zibetha constitute, at present, exclusively a genus to which the name *Viverra* might be preserved, by way of distinction; the Viverra Genetta, Fossa, and several others, are arranged by M.M. G. Cuvier, Desmarest, &c., as a sub-genus of Viverra; but their characters, in various particulars, are sufficiently marked, to sanction a separation into a distinct genus, to which the

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name *Genetta* would be properly applied. Of the other animals enumerated by Gmelin under the genus *Viverra*, the classification, as well as the existence, remains to be confirmed.

Of the various genera here enumerated, *Potos*, (or *Cercoleptes*), *Gulo*, and *Mephitis*, are *Plantigrada*; to these later discoveries have added two others, which, according to the views of Gmelin, would likewise have been associated with the multifarious genus *Viverra*, namely, *Mydaus* and *Paradoxurus* of Fréd. Cuvier. But my object in detailing these genera, is to add a few remarks on those animals which belong to the family of *Digitigrada*, in so far as they illustrate the affinity of *Mangusta*. Although these animals agree generally in the structure of their teeth, an examination of the relative development of their grinders, particularly of the carnassiers of Fréd. Cuvier, (the *chewing grinders* of Fleming,) suggests the following arrangement, *viz.* *Genetta*, *Viverra*, *Ryzæna*, and *Mangusta*. I have before me for this comparison, from the splendid museum of Joshua Brookes, Esq., a very perfect skull of *Genetta* and of *Viverra*, as above defined, with the skull of the *Mangusta javanica*, extracted from the specimen, the figure of which illustrates this article. In the *Genetta*, which lives in part, and often almost entirely, on vegetable food, the points of the carnivorous teeth are short and strongly rounded, and the tuberculous teeth, by the obtuseness of their points, indicate that they are comparatively much used in mastication. In *Viverra*, the habits of which are more exclusively carnivorous, the points of the posterior grinders are lengthened and acute, and the points of the tuberculous teeth are likewise more prominent. The fifth grinder in the lower jaw illustrates the character of these animals in the strongest manner. A very evident development of this tooth shews itself in *Viverra*; and, as far as I can judge from description alone, it is still greater in *Suricata* or *Ryzæna*; but in *Mangusta*, the points of this tooth exhibit a great elongation and acuteness; and this character, a development of the points of the teeth, is observed in a proportionate degree in all the grinders. In *Mangusta* a character and disposition strictly and exclusively carnivorous, exist in a higher degree than in *Suricata*, *Viverra*, or *Genetta*: and we find, in accordance with this, the carnivorous teeth and the grinders generally more acute and lengthened.

The examinations connected with the description of the *Mangusta javanica*, and the comparisons which I instituted among the numerous genera above mentioned, naturally suggested a reconsideration of the *Felis gracilis*, which was described in the first Number of these Researches: and as the most rigorous comparisons and examinations have confirmed my original views, regarding the natural affinity of this animal, I shall now concisely detail their result.

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For the purpose of following me in one of the most essential points of this description, I beg the reader to take before him the Plate of Illustrations contained in the First Number, and that which is annexed to the present Number, of these Researches. It will then be perceived that between the grinders of the *Felis gracilis*, and of the *Mangusta javanica*, there is a great resemblance. In the grinders of the upper jaw of the *Felis gracilis* this resemblance appears indeed only partially. The view which, in making the delineation, was taken from the specimen prepared for the Museum, did not exhibit the tuberculous tooth with the minuteness of detail that would have been desirable; and what appears a single posterior tuberculous tooth, will probably, on an inspection of the naked cranium, be found to consist of two teeth placed in close contact: but the contour and separate parts of the other teeth are given with a degree of accuracy sufficient for my present purpose. In the grinders of the lower jaw this resemblance is strong and apparent: thus, with the exception of the additional heel of the base of the three first false grinders, these teeth, in both animals, are perfectly similar; and in the most characteristic tooth, the fifth grinder, being the true *carnassier*, or carnivorous tooth, it is difficult to perceive any difference whatever. But if the comparison be extended to the front teeth of these two animals, they will be found to be perfectly dissimilar. The front teeth of *Mangusta javanica* have all the characters of the Viverrine animals enumerated—namely, *Genetta*, *Viverra*, (as above limited,) *Suricata*; (agreeably to Desmarest and Illiger,) and *Mangusta*; while the *Felis gracilis* will be found strictly to agree with the teeth of Feline animals. After these remarks relating to the teeth alone, I proceed to compare the other characters of *Felis gracilis* with those of Viverrine animals generally. The *Felis gracilis*, exclusive of the lengthened muzzle and slender body, has the general physiognomy of Feline animals. Its claws are completely sheathed, and retractile, and its feet have precisely the same covering, disposition, and attitude as those of Cats; with this difference, that *Felis gracilis* has five toes to the hind feet, while the genus *Felis*, as previously known, has only four. To afford a distinct view of this most essential character, care has been taken both in the plate of details and in the figure of *Felis gracilis*. This animal further agrees with the Feline tribe in the absence of the anal folliculus, or pouch. Of this I am enabled to judge, by the complete absence of all odour during the period I had it in confinement. The Viverrine animals hitherto known, and particularly the *Mangusta javanica*, have long, naked, horny claws, which, although defined semi-retractile and semi-vaginate, possess this property in a very slight degree, and are more properly fitted for burrowing in the earth, which many of them, and particularly the *Mangustæ*, perform with great dexterity. They have, without exception, either simple follicules, gradually larger in size in the successive genera, according to the order in which they have been enumerated, or an extensive anal pouch or sack. Their tail is in a greater or less

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degree acuminate, which contributes, with their other characters, to give them a physiognomy essentially different from that of Feline animals.

From these details it appears, that although the *Felis gracilis* agrees with the *Mangusta javanica* in the structure of the grinders, particularly of those in the lower jaw, it is in other respects entirely different, as well from this animal, as from Viverrine animals generally; while, with a slight modification of characters, it agrees with the Feline animals hitherto known, particularly in the general physiognomy, in the structure and disposition of the feet and claws, in the absence of an anal pouch, in a cylindrical tail, and even in the external marks on the skin. We have thus an agreement in one character, or a relation of analogy, while in the aggregate of the other characters, which should regulate us in the classification of the animal, we have an indication of its relations of affinity.

When I examined the *Felis gracilis*, preparatory to the description which has been given in the First Number of the Zoological Researches, these different relations occasioned me some perplexity. After carefully balancing its characters, and exhibiting a tabular view of the genera *Felis* and *Viverra*, as defined by Illiger, to shew at one view its relations to both these genera, I finally determined, by a preponderance of what appeared to me its natural character, to associate it with the genus *Felis*. This indeed appeared to me more a family than a genus; but the peculiarities of the *Felis gracilis* made it necessary to construct and define a distinct section, for which I proposed the name of PRIONODONTIDÆ. When I discovered the *Felis gracilis* in the forests of Blambangan, before I had considered the numerous subdivisions which the genus *Viverra*, as employed by Gmelin, requires, I included it in that genus in a Catalogue of Mammalia, which I forwarded to England in the year 1812; but a more careful examination has convinced me that it cannot be separated from Feline animals, however peculiar in some characters, without violating its natural affinities.

Having already stated that the discussion of the characters of the *Mangusta javanica* almost insensibly led me to a reconsideration of those of the *Felis gracilis*, I can now add, that several of the difficulties which presented themselves, when the First Number of these Researches was prepared, in the classification of this animal, from the existence of those characters which rendered it doubtful whether it be a *Felis* or a *Viverra*, have in a great measure been removed by the views to which I have been directed by the *Horæ Entomologicæ* of my learned and highly respected friend, W. S. Macleay, Esq., in which, from an admirable extent of observation and research, and with consummate originality, he has explained and illustrated the

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various relations of animals. I shall therefore, agreeably to the direction afforded to me by this work, consider the *Feline* animals as one series, and the *Viverrine* animals as another series. That the animals of the former series are still imperfectly known, can clearly be demonstrated. As one proof, I shall adduce the *Felis capensis* of Forster. This distinguished naturalist, who was not unacquainted with the characters of *Felis* and *Viverra*, as defined by Linnæus, clearly gives, as a property of the animal described by him, a *lengthened head*. Phil. Trans. Vol. LXXI. p. 5. *Caput rostro magis acuto quam Felis cati*. And M. Desmarest, in describing this animal in the Encyclopédie, offers in a note the following remark:—"M. Georges Cuvier, au quel on doit les rapprochemens que nous adoptons, a lui-même balancé à regarder le chat du Cap, *Felis capensis* de Forster, comme une vraie civette. Dans son *Mémoire sur les espèces de chats*, il le considère comme une espèce voisine du chat serval; mais dans son dernier ouvrage (*le Règne Animal*), il dit qu'il ne diffère pas de la genette." Concerning the *Viverra tigrina* of Schreber, which was figured by Vosmær, it more resembles a *Feline* than a *Viverrine* animal. M. Desmarest points out its affinity to the *Felis gracilis*; and the name given it by Vosmær, *Chat-bisaam*, shews that he considered the characters of the Cat to predominate. The specific character also exhibits a remarkable agreement with our animal in the external marks, at the same time that it clearly indicates a specific distinction. We have thus in the *Felis capensis*, and in the *Viverra tigrina* Gmel., two animals of the *Feline* series, which are analogous to *Viverrine* animals; and it may reasonably be expected, that future discoveries will make known others, which will unite the *Felis gracilis* with the *Feline* animals now known, and thus complete the series which is still interrupted. In the *Viverrine* animals, which are apparently better known, the series is more regular; according to the relative development of the grinders, it has been arranged above in the following order: Genetta, *Viverra*, *Suricata*, *Mangusta*. The proportional development of the anal folliculi also confirms this disposition: in Genetta it constitutes a simple excavation; in *Viverra* it is a pouch, divided into two sacks; in *Suricata*, and particularly in *Mangusta*, it consists of an extensive portion of integument, with numerous folds, which passes over and incloses the anal aperture. These observations, which shew the regularity of the *Viverrine* series, and the interruption still existing in the *Feline* series, were necessary to my conclusion, that, although the *Felis gracilis* agree with the *Mangusta javanica* in its relations of analogy, the aggregate of its characters, which constitute its relations of affinity, associate it with *Felis*. In illustration of these observations, I shall introduce Mr. Macleay's words:—"The test of a relation of affinity is its forming part of a transition continued from one structure to another, by nearly equal intervals, and the test of a relation of analogy, is barely an evident similarity in some *one or two remarkable points* of formation, which at first sight give a character to the animal,

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and distinguish it from its affinities. As a relation of analogy must always depend on some marked property, or point of structure, and as that of affinity which connects two groups, becomes weaker and less visible as these are more general, it is not at all surprising that what is only an analogical correspondence in one or two particulars, should often have been mistaken for a general affinity."—*Horcæ Entom. Vol. I. p. II. p. 364.*—These remarks explain at once, and remove the difficulties which have occurred in the classification of the *Felis gracilis*. By regarding its relations of analogy alone, which I presume I have observed in the grinders, and particularly in those of the lower jaw, it has (as far as appears to me) improperly been classed with Viverrine animals; and it has therefore been my endeavour to shew that its relations of affinity associate it with Feline animals.

Directed and confirmed by these views, I shall in future consider the *Felis gracilis* as the type of a distinct genus in the *family* of Feline animals, and designate it by the name of PRIONODON, which has already been proposed for a section of the *genus* *Felis*. This name accords with the character of the teeth. Comparatively with those of other Feline animals, the teeth are not only more numerous, but they are more compressed and elongated; their crowns are more strongly notched or serrated, exhibiting numerous acute points; and a lateral view of them may aptly be compared to a saw, the teeth of which are jagged or uneven. The name is accordingly compounded of two Greek words (*πριων* and *οδους*), explaining the character of the teeth.

Drawn by W. Dendall.



LUTRA LEPTONYX.

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LUTRA LEPTONYX.



ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille. Les Carnivores.

ORD. III. FERÆ, *Linn. Syst.*

ORD. XII. FALCULATA, *Illiger*. Fam. 36, Gracilia.

LUTRA, *Ray. Briss. Erxleb. Cuv. Shaw. Illig.*

MUSTELA, *Linn. Gmel.*

CHAR. GEN.—*Dentes primores* supra sex; infra aut sex, quorum exteriorum secundus angustior et interior, aut quatuor (in *Marina Stelleri*). *Laniarii* distincti, primoribus longiores, conici, acuti. *Molares* obducti, supra utrinsecus quinque (aut quatuor): tres (duo) antici sectores, conoidei, quartus (tertius) sectorius, maximus, gradu interno laterali, postremus tritorius, tuberculatus; infra utrinsecus sex (aut quinque) primus minutus, duo sequentes (antici) sectores, conoidei, penultimus sectorius, maximus, acie bicuspidē, ultimus tritorius, tuberculatus.

Rostrum calvaria brevius. *Nasus* obtusus rhinario lato. *Oculi* membrana nictitante.

Auriculæ breves rotundatæ.

Corpus codario et pilis longioribus vestitum. *Cauda* brevis. *Mammæ* apertæ ventrales. *Glandulæ* odoriferæ anales.

Pedes distincti subretracti, subobvoluti, ambulatorii, palmati, pentadactyli, postici, laterales, podio antrorsum verso.

Plantæ nunc denudatæ, nunc pilosæ.

Ungues: falculæ acutæ aut sublamnares,



Lutra fusca nitore fulvo, gula sordide flavescente, cauda corpore dimidio breviorē, unguibus brevibus obtusis sublamnaribus.

Welingsang or *Wargul*, of the Javanese.

Anjing-ayer, of the Malays.

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Simung, of the Inhabitants of Sumatra. *Sir T. S. Raffles's Cat. of a Zool. Col. Tr.*

Linn. Soc. XIII. p. 254.

Gryze Otter, *Verh. van het Bataviaasch Genootschap, Deel. II. p. 457.*

AS the appearance which the Javanese Otter presents on a superficial view, may occasion the remark, that its separation from the common Otter of northern climates is a needless augmentation of the Systematic Catalogue, I have, in the following description, entered into more details than the nature of the subject would otherwise require. There is perhaps no genus among quadrupeds, in which the discrimination of the species requires a greater nicety of comparison. The Common Otter, the Javanese Otter, and the American Otter, (including both the Canadian and Brazilian Otter of authors), are so nearly alike in external appearance, that the specific character drawn by Linnæus for the *Mustela Lutra*, applies to them all. But as research is extended, and as new subjects are added to our Collections, a greater amplitude is required, both in the specific character and in the descriptions, in order to afford means to the naturalist to discriminate those species, which, from an agreement in several external characters, are liable to be confounded.

When I first observed the *Lutra leptonyx*, I considered it as specifically the same as the Common Otter of Europe and Asia. My opinion was formed only from its general external appearance; and I was confirmed in it by the observation, that the Javanese Fauna contains various subjects which are likewise found in Europe. Of these I may enumerate the Golden Plover—*Charadrius pluvialis*; the Kentish Plover—*Charadrius Cantianus*; and the Common Snipe—*Scolopax Gallinago*. Even in the White Owl, the *Strix flammea* of Linnæus, as existing in Java and Great Britain, no clear distinction can be pointed out; and several other subjects have been enumerated in the Systematic Catalogue of Birds from Java. In the vegetable kingdom a similar fact has been observed; and Botanists are acquainted with several plants, which preserve the same character in the most distant countries. But a more accurate inquiry than I was able to make in Java, and a careful comparison of specimens of the different species of the genus, have shewn to me that this remark does not apply to the Javanese and to the Common Otter. The characters which distinguish the American Otter, are detailed with great precision by Joseph Sabine, Esq., in the comprehensive account of the Quadrupeds and Birds, of which specimens were collected during Captain Franklin's journey to the shores of the Polar Sea, which has contributed greatly to the illustration of the Zoology of Arctic America.

LUTRA LEPTONYX.

I am also indebted to the kindness of this gentleman, for the means of extending my comparison to a specimen of the American Otter, and of becoming more accurately acquainted with the Common Otter which inhabits England; and I shall now detail the characters by which the Javanese Otter is distinguished.

The head, in the *Lutra leptonyx*, has a different form from that of the *Lutra vulgaris*. It is narrower and more lengthened, and the ears have comparatively a posterior situation. The physiognomy of the animal, in consequence, when accurately regarded, is essentially different. The neck is considerably longer: the tail is smaller, both in its vertical and transverse diameter; it is somewhat shorter in proportion to the body, and more acutely terminated. The anterior extremities are likewise proportionally longer, and the entire habit is more slender and extended. In these characters the Javanese Otter approaches to the American Otter; but, agreeably to the comparison which I have made, it differs essentially in size and colour. It has likewise a peculiarity in the size and structure of the claws, from which the specific distinction is principally derived. In the Common and in the American Otter, the claws are robust, long, compressed, curved, very acute, and projecting beyond the extremity of the toes: in the Javanese Otter they are weak, short, obtuse, resembling thin laminæ or scales, which are buried in the fleshy extremity of the last phalanx. They have, in their disposition, some resemblance to the claws of several monkies. This character exists in the toes of both extremities, nearly in an equal degree. In very young subjects the claws are acutely terminated, and project slightly beyond the toes; but they have the same slenderness of texture. Two adults, an half-grown, and various young specimens are contained in the Museum of the East India Company, in all of which this character is the same. Baron von Wurmb, the author of the description of the Gray Otter of Java, contained in the second Volume of the Batavia Society's Transactions, also points out this character, describing the toes as being provided with "rounded claws."

The distribution of the external marks is similar in the Javanese, the Common, and the American Otter. All the parts are uniform in colour, except the sides of the head, the throat, and that portion of the breast which is nearest to it. In the Common as well as in the American Otter, the dark parts have a pure brown tint, very intense; in the Javanese Otter they are brown, less intense, and present a tawny lustre: the lighter tints on the sides of the head, the throat, and part of the breast, have a whitish silvery lustre in the former; in the latter they are yellowish, dusky, without any gloss, and the distinction of the colours is continued lower along the neck. The Javanese Otter has, like the Common Otter, a double series of whiskers;

LUTRA LEPTONYX.

the anterior of which arises from the sides of the nose near the upper lip; the posterior, opposite the junction of the jaws. The bristles are numerous, rigid, and closely applied to the head. The ears agree in form with those of the Common Otter; they differ, as already observed, in their disposition, being far removed from the eyes, and from the angle of the mouth. The teeth have the characters of the genus *Lutra* as defined by Illiger, and as represented by Fréd. Cuvier on the 29th Plate of the "Dents des Mammifères." They differ in no essential point from those of the Common Otter. In the Javanese specimens there are but two false grinders in the upper jaw; this is the same in Mr. Sabine's specimen of the Common Otter, and in the American Otter; in a specimen belonging to the British Museum, which is remarkable on account of its size, there are three false grinders above. The eyes are situated near the nose, and are small, vivid, and dark-coloured.

The covering of the *Lutra leptonyx* has the same character as that of the *Lutra vulgaris*; it is made up of hairs which are downy at the base, rigid, and somewhat bristly at the termination, and closely applied to the body; the fur would be useful, could the animal be obtained in sufficient numbers. Dr. Finlayson, in his account of the Siamese Otter, which he considers to be the same with the Common Otter, states, that the skins form an article of trade between Siam and China.

In its size the Javanese Otter is somewhat inferior to the Common, and to the American Otter, as appears from the following estimate.

DIMENSIONS OF THE LUTRA LEPTONYX.

	Feet	Inches	Lines.
Length of the body and head, from the extremity of the nose to the root of the tail, (English measure)	2	1	0
..... the tail.....	1	0	0
Circumference of the tail at the base.....	0	5	0
Breadth of the tail at the base.....	0	1	6
Distance between the ears	0	3	6

DIMENSIONS OF THE LUTRA LEPTONYX,

From the Batavia Society's Transactions.

Length of the body and head, from the extremity of the nose to the root of the tail, (Dutch measure).....	1	6	0
..... the tail.....	1	0	0
Breadth of the tail at the base	0	2	0
Distance between the ears	0	3	0

LUTRA LEPTONYX.

DIMENSIONS OF THE COMMON OTTER,

From a Specimen preserved in the British Museum.

	Feet	Inches	Lines.
Length of the body and head, from the extremity of the nose to the root of the tail, (English measure)	3	0	6
..... the tail.....	1	8	6
Circumference of the tail at the root.....	0	10	0
Distance between the ears	0	4	9

The American Otter measures from the nose to the root of the tail full three feet six inches, and the tail eighteen inches; the latter is four inches broad at the base.

The Javanese Otter agrees in its manners with the Common Otter. It inhabits the banks of rivers, and lives on fishes. Its disposition, when found at large, is extremely ferocious; if attacked, it defends itself with courage. It is with great difficulty taken in its adult state; but if obtained young, it is mild and tractable: in this state it is occasionally seen in dwellings; but I never observed it to continue long in confinement. The natives distinguish two varieties of the Javanese Otter; to one of which, the name of WERGUL, to the other that of WELINGSANG is applied: the former is of a gray colour, and is said to be solitary, while the latter lives gregariously; but these statements require confirmation.

The Otter is found near the sea, in all the large rivers, both along the northern and the southern coast of the island; but, as far as I have observed, it does not establish itself in the interior. In the account given in the Batavia Society's Transactions, its voice is said to resemble that of a human being when weeping. It shews a great attachment to its young.



FELIS JAVANENSIS.

Drawn by W. Daniell.

Engraved by W. Taylor.

FELIS JAVANENSIS.

ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille. Les Carnivores, 2^{de} Tribu, Digitigrades.

ORD. III. FERÆ, *Linn.* Syst.

ORD. XII. FALCULATA, *Illiger*. Fam. 35, Sanguinaria.

FELIS, *Linn.* *Briss.* *Eræleb.* *Cuv.* *Geoff.* *Illig.*

CHAR: GEN:—*Dentes Primores* intermediæ æquales. *Molares* supra utrinsecus quatuor, tertius maximus, interius gradu laterali auctus, quartus tritorius (aliis nullus). Infra utrinsecus tres, tertius maximus. *Rostrum* breve, rhinario rotundato. *Lingua* restorsum aculeata. *Folliculus* supra anum nullus. *Pedes* digitigradi antice pentadactyli, postice tetradactyli. *Ungues*: falculæ acutæ retractiles.

Felis cauda abbreviata, corpore griseo-fusco, supra lineis quatuor fuliginosis dorso interruptis, lateribus maculis oblongis abdomine maculis subrotundis notato, gula fascia una, jugulo duabus fuliginosis.

Kuwuk, of the Javanese.

Chat de Java, *Cuv. Mem. sur les especes du genre chat, Ann. du Mus. tom. 14, pag. 159. n. 26.*

Felis javanensis, *Desm. nouv. Dict. d'Hist. Nat.*

Felis javanensis, *Encycl. Method. Mammalogie, par M. A. G. Desmarest, 1820.*

THE subject of this article belongs to a subdivision of the genus Felis, which is characterized by a small size, somewhat elevated legs, a short tail, and by three grinders only in each jaw. In discriminating the numerous species which are arranged in this subdivision, a very careful comparison of the characters peculiar to each is required; and in the figure which illustrates this subject, great care has been taken to afford an accurate representation of the Felis javanensis. Among the Indian species it may be confounded with the Bengal Cat of Pennant, with *Felis Galeopardus* of Desm. in Encycl., which is the *Serval* of M. Fred. Cuvier, and with *Felis undata* of Desm. in Encycl. By means of an accurate description, accompanied by a faithful drawing, contained in the Museum of the Hon. East India Company, I have ascertained the Bengal Cat to be considerably larger; to have a different disposition of the marks on the breast, sides of the body, and tail, and different habits and manners. The peculiar characters of the Serval are accurately represented in the figure of M. Fred. Cuvier; it is distinguished by a darker colour; by the

FELIS JAVANENSIS.

marks on the back and on the sides of the body, and by its having an annulated tail. The *Felis undata* of Java varies chiefly by a transverse disposition of the spots on the sides of the body, and by a brighter colour. A distinct species has recently been added to the Hon. East India Company's collection from Sumatra.

The general colour of the *Felis javanensis* is grayish brown, exhibiting on the body, neck, and limbs a delicate mixture of gray of different shades; the upper parts are more intensely coloured, and incline to tawny; the throat, cheeks, fore-part of the neck, the breast, belly, and tail underneath are whitish. Although it resembles the common domestic cat in many points, the smallness of the ears, and their distance from the eyes, give to its front a different appearance; the form of the body is likewise more slender.

The specific character is founded on the disposition of four dark brown or blackish stripes, deeper and more regular on the head, neck, and back, passing, with interruptions of the general gray colour, to the root of the tail, on the regularity of the lateral spots on the body, and on the transverse bands on the throat and breast. As the four longitudinal lines on the head and back are observed in most of the allied species, and even in several varieties of the common domestic cat, it is necessary, in defining the specific distinctions, to combine these with other characters. In the *Felis javanensis* four interrupted lines of oblong spots may be traced on the sides of the body, extending to the rump, more regularly disposed than in the other species that I have examined, while the marks on the belly are roundish. On the limbs and tail similar spots are distinguished in broken lines, at small distances; on the latter they are very obscure. The inner side of each of the limbs is marked transversely with two indistinct lines. The face has the same colour as the body, the region of the mouth being paler, and marked with several transverse stripes, from which arise numerous bristles, shorter than the head, diversified with gray and white. A long white streak, broader above, marks the side of the nose, and is continued towards the forehead. Between the two inner frontal lines an obscure stripe appears, which is lost on the neck, where the two exterior lines diverge, and taking an oblique direction on the back, continue a small branch over the shoulders.

The eyes are placed more anteriorly in the head than in several other species; the irides are yellowish, inclining to brown; the pupil is circular. The ears are round and small; from their base anteriorly rises a thick tuft of hair; exteriorly the base is white, and they are terminated by a broad black margin. Behind the ears an extensive black spot marks the sides of the head. From the posterior angle of the eye, a short narrow stripe passes under the ear. The superior transverse band rises from the cheek, near the angle of the mouth, and, after taking a curve

FELIS JAVANENSIS.

backwards, passes to the throat, and unites with that of the opposite side. Of several transverse bands crossing the anterior part of the neck, two are more apparent, and form one of the specific distinctions of the *Felis javanensis*. The fur is long, and soft to the touch, but does not form so close a covering of the body as that of the subject of the next article.

The front and canine teeth differ in nothing from those of the other species belonging to this subdivision of the Genus; the grinders are proportionally of moderate size, and compressed. The first in the upper jaw projects but slightly above the gums; the second is tricuspid, having one long and two short points; the third is large, and has the usual form, but the anterior internal projection is scarcely perceptible. In the lower jaw the two anterior grinders are tricuspid; the third is largest, having two equally prominent, and one shorter point.

The claws are completely retractile, and when the animal is at rest, concealed by the soft fur which plentifully covers the feet.

DIMENSIONS.

Length of the body, from the extremity of the nose to the root	
of the tail	1 Foot, 11 inches.
..... the head.....	4½ do.
..... the tail	8½ do.
..... the anterior extremities, from the shoulder to the	
extremities of the toes	7 do.
..... the posterior extremities	9 do.

The *Felis javanensis*, or *Kuwuk*, is found in large forests in every part of Java. It forms a retreat in hollow trees, where it remains concealed during the day; at night it ranges about in quest of food, and often visits the villages at the skirts of the forests, committing depredations among the hen-roosts. The natives ascribe to it an uncommon sagacity, asserting that, in order to approach the fowls unsuspected, and to surprise them, it imitates their voice. It feeds chiefly on fowls, birds, and small quadrupeds; but, in case of necessity, it also devours carrion.

This animal is perfectly untameable; its natural fierceness is never subdued by confinement. The same character is given to the Bengal Cat by Drs. Gibbon and Buchanan; but it has not the disagreeable odour ascribed to that species, nor does it frequent reeds near to water, to feed on fish, snails, and muscles. I first collected the *Felis javanensis* in the year 1805, in the extensive forests of Pugar and Blambangan. These also contain the *Felis undulata*; the latter, as far as my observations extend, is confined to the eastern extremity, while the former is by no means scarce, and distributed through every part of Java.



FELIS SUMATRANA,

Drawn by W. Daniell.

By permission of the British Museum.

FELIS SUMATRANA.

ORD. III^{me} CARNASSIERS, *Cuvier*. 3^{me} Famille. Les Carnivores, 2^{de} Tribu, Digitigrades.

ORD. III. FERÆ, *Linn.* Syst.

ORD. XII. FALCULATA, *Illiger*. Fam. 35, Sanguinaria.

FELIS, *Linn.* *Briss.* *Eraleb.* *Cuv.* *Geoff.* *Illig.*

CHAR. GEN.—*Dentes Primores* intermediæ æquales. *Molares* supra utrinsecus quatuor, tertius maximus, interius gradu laterali auctus, quartus tritorius (aliis nullus). Infra utrinsecus tres, tertius maximus. *Rostrum* breve, rhinario rotundato. *Lingua* retrorsum aculeata. *Folliculus* supra anum nullus. *Pedes* digigradi antice pentadactyli, postice tetradactyli. *Ungues*: falculæ acutæ retractiles.

Felis cauda abbreviata apice fusca, corpore ex flavesciente griseo-ferrugineo maculis atro-fuscis dorsalibus lineari-oblongis confluentibus, lateralibus angularibus irregularibus sparsis.

THE name of *Felis javanensis* having been applied to a subject described in the first number of these Researches, which appears to be peculiar to Java, the present species, which has been forwarded to the Museum of the Honourable East India Company by Sir Stamford Raffles, from the neighbouring Island of Sumatra, on which it has hitherto been found exclusively, may with propriety be denominated FELIS SUMATRANA. In the article referred to, the resemblance which exists between the smaller species of this genus, hitherto described by authors, has been pointed out; and although between several it is very close, they possess, individually, characters too well defined, to allow them to be united into a single species. The *Felis javanensis* and the *Felis bengalensis* are most allied; to these the Serval, the *Felis galeopardus*, approaches nearest in external characters; the *Felis undulata* is readily distinguished by the transverse disposition of its marks; and the *Felis sumatrana* possesses peculiarities still more obvious and striking. All these species are natives of the East Indies: the same remark regarding the affinity of external characters, applies to the more numerous species of this genus which are found in North and South America.

In size, in the proportion of the legs to the body, and in the shortness of the tail, our species agrees with the *Felis javanensis*; it is also, like that animal, marked with four dark brown lines, consisting of oblong confluent spots, which commence on the forehead, between the eyes, and pass along the back to the root of the tail,

FELIS SUMATRANA.

and with several transverse bands on the throat and breast; but it exhibits the following peculiarities. The general colour is ferruginous, inclining to yellowish-gray, more intense on the back, the crown of the head, and the upper part of the tail; paler on the sides, and passing into whitish-gray on the cheeks, breast, abdomen, and the interior of the thighs and legs. The spots on the sides of the body are angular, and scattered almost without regularity, very different from the longitudinal, nearly parallel lines which exist in the *Felis javanensis*: it is difficult indeed to convey by words a correct idea of their arrangement, and I must therefore refer, in illustration of the description, to the figure in which they are carefully represented by Mr. Daniell, as they exist on the animal. The colour of the spots is intensely brown, inclining to black. On the anterior portion of the back, between the shoulders, we can trace the commencement of a series of irregularly transverse spots, stretching obliquely across the sides of the belly. Immediately before these, and exterior to the first of the marks which constitute the longitudinal line on the back, is a similar triangular spot, but with more regularly defined sides; a little below this, on the sides of the breast, are three triangular spots, placed in regular succession, and in contact with each other; they all present one of their points backward, and meet the last of the spots of the obliquely transverse series above mentioned, which is followed by three other spots, more lengthened, and pointing backward. Between this series and the streaks on the back, several spots are disposed, of an irregular oblong form: the marks on the flanks follow in succession, but are irregular in size and form, and on the lower part of the abdomen they are rounded, and smaller. As the various longitudinal series approach the lower part of the back and the thighs, they increase in number, so as almost to cover those parts, which have a more intense colour, with irregularly oblong spots. The limbs are marked with lines, disposed at small distances; they are narrow, and interrupted: on the anterior extremities, several large irregularly rounded spots are scattered through these. Towards the feet the colour is more uniformly rufous, and the marks are more minute and indistinct. The interior of the limbs is marked with two transverse lines, of unequal breadth, in the same manner as the *Felis javanensis*. On the upper part of the base of the tail, numerous narrow transverse lines are crowded together; they are more pale and distant in the middle, and the extremity is uniformly brown. The face resembles that of *Felis javanensis*, but the cheeks, as well as the breast, are paler, and on the former several minute spots are scattered. The first grinder in the upper-jaw of our specimen is wanting; in all other respects the teeth agree with those of *Felis javanensis*, which is also the case with the eyes, ears, and whiskers.

It is denominated by the Malays *Rimau bulu*, and is one of the various species of *Felis* which are found on the Island of Sumatra. See T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra. Trans. Linn. Soc. XIII. p. 249.



One foot.

FELIS GRACILIS.

FELIS GRACILIS.

ORD. III^{me} CARNASSIERS, *Cuvier*.

ORD. III. FERÆ, *Linn. Syst.*

ORD. XII. FALCULATA, *Illiger*.

FELIS, *Linn. Briss. Eræleb. Cuv. Geoff. Illig.*

CHARACTER GENERICUS.—*Vide Felis javanensis.*

Sect. PRIONODONTIDÆ, *Nob.*

Dentium formula: Incis. $\frac{6}{6}$, *Canini* $\frac{1-1}{1-1}$, *Molares* $\frac{5-5}{6-6}$.

Molares omnes multicuspides, superiorum *quartus* maximus gradu laterali mediocri auctus, quintus tritorius. Infra *quintus* maximus, acie externa postica longissima, acutissima. *Rostrum* elongatum, rhinario prominulo. *Corpus* codario et pilis densis vestitum. *Cauda* longissima. *Pedes* digitigradi pentadactyli. *Ungues*: falculæ retractiles parvæ acuminatæ.

Felis cauda elongata annulata cylindrica, corpore dilute-flavescente, fasciis dorsalibus quatuor latissimis, analibus duabus angustis, striis lateralibus duabus latis, cervicalibus angustis, maculis humeralibus et femoralibus pluribus, annulisque caudæ septem saturatissime fuscis.

Delundung, of the Javanese.

Viverra? Linsang. *Hardwicke in Linn. Trans.* Vol. XIII. p. 235.*

BEFORE proceeding to the description of the subject of this article, I have thought it proper to give a detailed comparative survey of the genera to which it is nearest allied, in order to exhibit the views by which I have been guided in pointing out its natural affinity. If I have been mistaken in the genus under which it is arranged, my object is still obtained, if I have shewn that it partakes of the characters of Felis as well as of Viverra, and that, in a natural arrangement, it stands between these two genera, or forms a link by which they are connected.

* General Hardwicke has, with a laudable zeal to extend our knowledge of Indian Zoology, which is greatly indebted to his extensive researches, communicated, in 1820, a concise description of this interesting animal to the Linnean Society. As the teeth in the specimen examined by him were wanting, the genus remained doubtful; and as his specific denomination is the native name of another Javanese animal, (a species of *Lutra*), it cannot with propriety be applied to this; and I have therefore substituted *gracilis*, as applying peculiarly to its form.

FELIS GRACILIS.

In the number of the toes of the hind feet, and of the teeth, as well as in the form of the head and body, the *Delundung* resembles the genus *Viverra*; but the character of the claws, as well as the peculiar structure of the teeth, and the use for which they are intended in the economy of the animal, indicate, in my opinion, a closer affinity to *Felis*. I have therefore placed it in that genus, in a separate section, which I have denominated *Prionodontidæ*; and, for the purpose of comparison, I now add *Illiger's* detailed description of the genera *Felis* and *Viverra*.

FELIS.

SECT. I.

Molares 4 aut 3 maxilla superiore, pedibus posticis tetradactylis.

Dentes Primores utrinque 6, in eadem serie collocati.

Laniarii distincti primoribus multo longiores conici acuti, versus apicem sulcis exarati.

Molares obducti, fere omnes sectores, supra utrinsecus 4 aut 3: antici duo conoidei crassiusculi, tertius maximus acie bicuspidate, et interius gradu antico laterali parvo auctus, quartus tritorius tuberculatus parvus interior transversus. Infra utrinsecus 3: antici duo compressi simplices, tertius maximus acie bicuspidate.

Rostrum calvaria brevius, obtusiusculum, rhinario prominulo rotundato.

Lingua retrorsum aculeata.

Pupilla his oblonga, illis orbicularis.

Auriculæ parvæ acuminatæ.

Corpus pilosum.

SECT. II. *Prionodontidæ*.

Dentes Primores utrinque 6, in eadem serie collocati, æquales (exterioriores vix majores.)

Laniarii distincti primoribus multo longiores conici acutissimi versus apicem læves.

Molares obducti supra utrinsecus quinque: antici tres sectores compressi; primus bicuspidatus, secundus subtricuspidatus gradibus posterioribus minoribus, tertius subquadricuspidatus, acie intermedia sectoria elongata, antice gradu uno postice duobus brevioribus auctus; quartus sectorius maximus acie una elongata, antice et postice gradibus duobus minoribus et interius processu laterali mediocri auctus; quintus tuberculatus tritorius. Infra utrinsecus sex: antici quatuor sectorii compressi; primus tricuspidatus; secundus, tertius, et quartus gradatim majores, quadricuspidati, gradibus posticis obsoletioribus; quintus omnium maximus quadricuspidatus, aciebus duabus externis sectoriis, posteriore longissima compressa, tertia interiore quarta abrupte brevior posteriore; sextus minor tuberculatus tritorius.

Rostrum elongatum acutiusculum, rhinario prominulo.

Lingua.

Pupilla orbicularis.

Auriculæ breves rotundatæ.

Corpus codario molli et pilis longioribus dense vestitum.

VIVERRA.

Dentes Primores utrinque 6, in eadem serie collocati.

Laniarii distincti, primoribus multo longiores, conici.

Molares obducti supra utrinsecus 6: tres antici sectores conoidei compressiusculi, quartus maximus sectorius acie subtricuspidate et interius gradu laterali antico parvo auctus, quintus et sextus tritores tuberculati, sexto minore. Infra utrinsecus 6: antici 4 sectorii unicuspidati (primo nonnullis deficiente,) quintus sectorius maximus, acie externa bicuspidate, tuberculis duobus internis aucta, et postice gradu magno quadrituberculato auctus, sextus tritorius tuberculatus magnus.

Rostrum acutiusculum, rhinario prominulo obtuso.

Lingua (certe antice) retrorsum aculeata.

Pupilla elongata transversa.

Auriculæ breves rotundatæ.

Corpus codario et pilis longioribus vestitum.

FELIS GRACILIS.

FELIS.		VIVERRA.
SECT. I.	SECT. II. <i>Prionodontidæ.</i>	
<i>Cauda</i> aut elongata, aut mediocris, aut brevis.	<i>Cauda</i> longissima.	<i>Cauda</i> longa.
<i>Mammæ</i> apertæ aut ventrales 4 vel 2, aut 4 pectorales et 4 ventrales.	<i>Mammæ.</i>	<i>Mammæ</i> apertæ aut 4 pectorales et 2 ventrales, aut 4 ventrales et pectorales nullæ.
<i>Folliculus</i> supra anum nullus.	<i>Folliculus</i> supra anum nullus?	<i>Folliculus</i> glandulosus inter genitalia et anum.
<i>Pedes</i> distincti ambulatorii digiti-gradi, antici pentadactyli, postici tetradactyli.	<i>Pedes</i> distincti ambulatorii digiti-gradi pentadactyli.	<i>Pedes</i> distincti ambulatorii digiti-gradi pentadactyli fissi.
<i>Plantæ</i> pilosæ.	<i>Plantæ</i> pilosæ.	<i>Plantæ</i> pilosæ.
<i>Ungues</i> falculæ acutæ retractiles vaginatae.	<i>Ungues</i> falculæ parvæ acuminatæ retractiles vaginatae.	<i>Ungues</i> falculæ acutæ semivaginatæ semiretractiles.
<i>Illiger.</i>		<i>Illiger.</i>

The *Felis gracilis* is strikingly characterized by a slender body, a tapering head and sharp muzzle, a long and thick tail, and slender delicate limbs. The relative proportion of these parts is carefully represented in the figure. The body in length is nearly equal to that of the domestic cat, but in consequence of its slender make, it has a greater resemblance in form to the various species of *Viverra*.

The following are the dimensions :—

Length of the body, from the extremity of the nose to the root of the tail.....	1 foot, $3\frac{1}{2}$ inches.
..... the head.....	$3\frac{1}{2}$ do.
..... the tail	1 foot, $\frac{1}{2}$ do.
..... the anterior extremities, from the shoulder to the extremity of the toes	$5\frac{1}{4}$ do.
..... the posterior extremities	$6\frac{1}{2}$ do.

The form of the head gives to the face a long and sharp aspect : both jaws are of equal length, but the lower mandible is sufficiently narrowed to allow the upper to enclose it, when shut. The eyes are of moderate size, very sprightly, and placed near the nose : the irides are brown, and the pupil circular. Numerous whiskers, rising from the upper lip, and pointing backwards, exceed the head in length ; several distinct patches of bristles are placed near the ears, and at the angle of the mouth. The nose is long, somewhat narrow at the extremity, of a dark colour, with a longitudinal stripe extending along the head, the colour of which is dusky gray. The opening of the nostrils is rounded below, and situated laterally. The ears are of moderate size, rounded and placed posteriorly in regard to the eyes ; from their inner base, and rather forward, rises a thick tuft of hair of a whitish colour, and a circle of thick bristles is placed before them on the lateral parts of the head. The anterior limbs are rather slender and delicate ; the thighs are robust in proportion to the size of the

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animal, and indicate considerable vigour in the posterior extremities. The toes are thickly covered with a soft and very delicate fur, which likewise occupies the interstices, and extends to the soles of the feet, as completely as in other species of the genus *Felis*. The claws are minute, sharp, transparent, and retractile; they are entirely concealed by the fur. The covering is remarkably soft and delicate; the hair forming the coat, is of moderate length, silky at the base, and closely arranged, so as to render it very pleasant to the touch. The tail is nearly equal in length to the body, exclusive of the head; it is perfectly cylindrical, fully and thickly covered with a long silky spreading fur, and beautifully marked with seven rings.

The strong contrast which exists between the pale yellowish white of the throat, belly, back, and tail, and the deep brown bands and spots on which the specific character is founded, gives the *Delundung* a striking appearance. Its elegance when alive, is perhaps not surpassed by any species of the genus *Felis*: and the specimen belonging to the Honourable East India Company's Museum, after a lapse of fourteen years, has preserved a considerable share of beauty. On a ground of pale yellowish white, which covers the throat, breast, belly, sides, and part of the back and tail, the distinguishing marks of a deep brown colour inclining to black, are arranged in the following manner:—Four transverse bands, gradually increasing in breadth, cover the back at intervals between the limbs; on the rump are two narrow bands; two longitudinal stripes take their origin, one between the ears, the other near the posterior angle of the eye, on each side, and pass, with interruptions at the transverse bands, to the thighs, where they are continued by numerous large spots which cover these parts. From the shoulders and thighs, several obscure stripes pass to the feet, which have a dusky gray colour. Between the origin of the longitudinal stripes of the body, and the transverse bands of the back, two smaller stripes are placed, which unite on the lower part of the neck, from the opposite sides.

I discovered this animal in the year 1806, during the early period of my researches in the district of Blambangan, situated at the eastern extremity of Java: the natives here distinguish it by the name *DELUNDUNG*. I have not been able to ascertain that it is found in any other part of the Island, or that it has another name. Even in Blambangan it is rarely met with. It inhabits the extensive forests, which, with the exception of the capital of Banyuwangi, and a few small villages, cover this district. Of its particular habits and manners, the natives could give me but little information. To observe and study these, as well as for the purpose of delineation, I obtained, after much research, a second individual; but this soon made its escape, and since this period I have not been able to find it in any part of Java.

In a manuscript catalogue, which I forwarded to the Honourable Directors of the East India Company, in the year 1812, this animal was noticed as a species of *Viverra*, with the specific name of *Delundung*.

MUS SETIFER.

ORD. IV^{me} RONGEURS, *Cuvier*. 1^{re} Division.

ORD. IV. GLIRES, *Linn.* Syst.

ORD. IV. PRENSICULANTIA, *Illiger*. Fam. 10, Murina.

MUS, *Linn. Erxleb. Briss. Cuv. Illig. &c.*

CHAR. GEN.—*Dentium formula*; *Primores* $\frac{2}{2}$, *Molares* $\frac{5}{3}$. *Primores* inferiores scalpro compresso acuto. Pro *Laniariis* diastema. *Molares* abrupti, obducti, tritorii, tuberculati.

Rostrum acutum. *Labrum* fissum. *Sacculi buccales* nulli. *Auriculæ* oblongæ aut rotundatæ, nudiunculæ.

Cauda elongata aut mediocris, squamata, annulata, raropilosa. *Mammæ* apertæ, pectorales et ventrales 4—12.

Pedes distincti, ambulatorii, antici digitis 4 et verruca hallucari, postici pentadactyli.

Ungues falculares. *Illiger*.

* * *Mures setosi vel spinosi.*

Mus cauda annulosa elongata, corpore setoso nigricante-fusco subtus cano, dorso setis suberectis rigidis hirsuto, uropygio setis longis æqualibus postice spectantibus oblecto, auriculis magnis rotundatis nudiunculis.

Tikus-wirok, of the Javanese.

THE distinguishing character of the *Tikus-wirok* of the Javanese is afforded by numerous rigid hairs, which are scattered over the upper parts of the body, and project widely from the general covering. These hairs commence immediately behind the neck; they increase in number on the back, and being considerably lengthened on the rump, they constitute a lax investment about the root of the tail and the uropygium. This peculiar character has suggested the specific name

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setifer, and associates our animal naturally with those species, which, in the article Mammalogie of the Encyclopédie, constitute the second section of this genus. It is however to be remarked, that these hairs are not of a spinous nature, as in the *Mus fasciculatus* and the *Mus macrourus*; they may properly be compared to bristles, having more consistence and rigidity than those of the *Mus decumanus* and *giganteus*; and in a natural arrangement, our animal stands between these species, and between those from which the character of the section is derived by M. Desmarest, and which, in a more rigorous sense, may be called spinous Rats.

Our animal agrees in many particulars of its form and proportions with the *Mus decumanus*, the *Brown* or *Norway Rat*; but it is larger, and more robust. The head is lengthened, and somewhat depressed. The nose is acute, and marked above with a longitudinal ridge of delicate hairs, while the extremity, in which the nostrils are situated, is naked: it is well calculated for burrowing the ground. The upper lip is deeply divided; the lower lip is considerably shorter than the upper, and the front teeth, in both jaws, are largely exposed; their colour is reddish-brown, and more intense in the upper jaw. These teeth are proportionally larger, and more robust in our animal than in the *Mus decumanus*; they are broad, strongly curved, attenuated in form of a chisel, and abruptly terminated, exhibiting very powerful cutting edges. The grinders, nearly resembling those of other Rats, are disposed in a perfectly regular series; they are transversely grooved above, and marked at the sides with striæ, or depressions. The eyes are small, vivid, and prominent. The whiskers are black and numerous, arising promiscuously from a large portion of the cheeks. Above the eyes, and near the temples, a single bristle arises from a separate point. The ears are long, broad, rounded, and covered towards the margin with a very minute down; the extent of the external lobe exceeds that of the *Mus decumanus*; several transverse divisions are observable in the interior.

The body of the *Mus setifer* is robust, lengthened, and cylindrical. In the proportion of the extremities to the body, our animal resembles the *Norway Rat*. The fore feet (in our specimens) are comparatively slender and weak; the thighs, in the posterior extremities, are remarkably robust. The feet are covered with hairs to the extremity; they are five-toed; in the fore foot the thumb is very minute, consisting of a somewhat lengthened compressed claw, removed far from the other toes, and supported by a tubercle, which when dried, acquires a corneous appearance; the other toes have the same proportions as the fingers in the human hand. The claws are slightly curved, obtuse, and apparently formed for perforating the ground. On

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the posterior extremities the three intermediate toes are largest; they are robust, and nearly of equal length; the outer and inner toes are smaller; the latter is considerably removed from the others, and admits a more lateral motion. Underneath, the feet are naked, and provided with prominent tubercles.

The body is posteriorly lengthened towards the uropygium or vent, affording thus a conical base to the root of the tail. This organ is nearly cylindrical, and very gradually attenuated to an obtuse point: it is covered with numerous delicate membranaceous rings; the disposition of these is regular in the highest degree; they are made up of oblong scales, placed in close contact, so as to exhibit the appearance of rings with crenulated margins, in which the separate squamæ are not perceptible. The tail is more naked than that of the *Mus decumanus*; a few short delicate hairs arise, in very small tufts of two or three, from the scales composing the rings.

The colour of our animal is dark brown above, and grayish underneath. The tint is more uniform than in the common Brown Rat. The separate hairs are gray, or tawny, at the base, and dark at the extremity, by which a slight variegation is produced on the surface. The covering is throughout rough and bristly; the hairs are short on the head and on the under parts generally, and they are here supplied with a little down at the base; among these, the rigid hairs or bristles, which give a character to our animal, are copiously scattered; they have an oblique direction on the back and the adjoining portions of the sides; they are here nearly an inch long; but on the rump they increase in length and in substance; their direction is more regular, and they constitute a lax covering about the posterior parts, which projects considerably beyond the body, and terminates in an abrupt manner.

Several points of agreement between the *Mus setifer* and the *Mus decumanus*, or Brown Rat, have already been enumerated: in my comparisons with other species of this genus, I have had the assistance only of figures and descriptions. Besides the peculiar rough and bristly character of its hair, our animal differs from the Brown Rat in the extraordinary size of its ears, in the strength of its front teeth, in the comparative nakedness of the tail, and in several minuter particulars in its form and proportions, which, although not easily expressed by words, become obvious by comparison. Among other Indian Rats the *Mus giganteus* and the *Mus perchal* have some affinity to it. The former is carefully described by General Hardwicke, in the VIIth Volume of the Linnean Transactions; and detailed drawings, accompanied with notices as to its size, have been received at the Honourable

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East India Company's Museum, in Colonel Mackenzie's collections. The *Mus perchal* is identified with the *Mus giganteus* by Fischer; but Geoffroy, in his Genus *Echimys*, distinguishes it with the specific name of *perchal*; and Desmarest has placed it in the second section of the genus *Mus*, to which likewise the *Mus setifer* belongs.

The *Tikus-wirok* is found in Java at the confines of forests and woods, and, agreeably to my observations, it rarely approaches the villages and dwellings of the natives. It is very shy in its habits, and is with great difficulty surprised and seized. Notwithstanding continued and careful research, I obtained but a small number of specimens, and by my inquiries I learned but few particulars as to its food and manners. The natives describe it as a bold and mischievous animal; the robustness of its form, and the remarkable size and strength of its front teeth, agree with this character. In its more prominent features, our animal agrees with several species of the first section of this genus; its nose is evidently employed in burrowing the ground in search of its food, and its tail has the character of those species which are in the habit of frequenting the water.

A species of Rat, which greatly resembles the *Mus setifer*, and which belongs to the same section of the genus, is described and figured by Dr. Hamilton, with the name of *MUS ICRIA*. It has, in a very conspicuous degree, the character of the projecting dorsal and anal bristles. In its size it somewhat exceeds the *Mus decumanus*. It lives in the neighbourhood of lakes, and the native name of *Icria* is significant of its superior strength and size.



SCIURUS INSIGNIS.

Drawn by W. Daniell

Engraved by W. Taylor

London, Published by Kingsbury, Parbury & Allen, Leadenhall Street, Oct. 1852.

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ORD. IV^{me} RONGEURS, *Cuvier*. 1^{re} Division.

ORD. IV. GLIRES, *Linn. Syst.*

ORD. IV. PRENSICULANTIA, *Illiger*. Fam. 9, Agilia.

SCIURUS, *Linn. Briss. Erxleb. Bodd. Cuv. Geoff. Illig. &c.*

CHAR. GEN.—*Dentium formula*; *Primores* $\frac{2}{2}$, *Molares* $\frac{5-5}{4-4}$. *Primores* superiores

pagina antica læves, inferiores admodum compressi acuti. Pro *Laniariis* diastema.

Molares abrupti obducti tritores, supra antico accessorio.

Rostrum acutum. *Labrum* fissum. *Sacculi buccales* nulli. *Auriculæ* oblongæ, penicillatæ vel rotundatæ simplices.

Cauda elongata villosa, compressiusculo-disticha vel cylindrica. *Mammæ* apertæ.



** *Cauda cylindrica, vel apice tantum disticha.*

Sciurus fuscus griseo variegatus subtus albidus, striis tribus nigris longitudinalibus, hypochondriis femoribusque tænia ferruginea diffusa, lateribus colli et abdominis angusta notatis.

Bokkol, of the Javanese.

Sciurus insignis, LE LARY, *Fréd. Cuv. Mamm. lithogr.* 34^{me} livraison. *Encycl. Method. Mammalogie, Supplement*, p. 544. Par M. A. G. Desmarest, 1822.



THE discovery of numerous species of the genus *Sciurus*, in recent periods, has required the establishment of a second section, in which those individuals that are provided with a cylindrical tail, are separated from the common Squirrels of Europe and North America, in which the hairs on this organ are disposed in two rows. Of these new species, some have been added from South America, others from the Islands of the Indian Archipelago; the latter are likewise distinguished by short rounded ears with a narrow helix closely applied to the head, destitute of a brush-like appendage of long hairs, and by genital organs, in the male, of uncommon size.

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The *Bokkol* of the Javanese, which is now to be described, belongs to this section. The covering is grayish-brown, inclining to tawny above and on the sides, and white underneath, with an intermediate streak of a ferruginous tint, extending from the angle of the mouth to the posterior extremities, with different shades of intensity, and diffusing itself irregularly over the thighs and flanks. But a distinguishing character is afforded to the Bokkol by three black lines, about one fourth of an inch in breadth, extending from the neck to the rump. One of these is placed in the middle, and follows the course of the spine; the others are parallel to it, one on each side, at a distance equal to the breadth of the lines. The upper parts are delicately variegated, in consequence of the alternate bands of gray, tawny, and black with which the separate hairs are marked. The muzzle and forehead are nearly uniformly gray, with a slight diffusion of a blackish brown colour. On the crown of the head, and on the neck above, this colour is more intense. The white colour of the under parts shews itself distinctly on the throat and neck; it is more obscure and contracted on the breast and abdomen. The intermediate ferruginous streak begins on the lateral parts of the head; on the throat and neck it is obscure and partial; it diffuses itself irregularly over the shoulders and along the abdomen, mixing with the gray of the sides, and the white of the lower parts. It is broader and more intense on the flanks, and spreads on the anterior part of the thighs, while the lower parts of the thighs, as well as the legs, on both extremities, agree in colour with the upper parts. The feet have the same tints as the muzzle and forehead. The tail has a more intense colour than the body, and is obscurely undulated with brown and black, having gray hairs irregularly scattered over it. The claws are of a pale horny colour, and the front teeth are rendered conspicuous by a beautiful reddish-brown glossy tint. Several long black mustaches, closely applied to the head, arise near the lip from the extremity of the muzzle.

The covering of the Bokkol is thick and close, consisting of long hairs, soft to the touch, closely applied to the body, and plentifully supplied at the base with soft down. The hairs of the tail are greatly lengthened. The characters which chiefly distinguish the section to which our animal belongs, from that which contains the European and North American species, are a cylindrical tail, and rounded ears. Towards the extremity of the tail, the hairs are loosely disposed in the Bokkol, but they never separate into two rows, as in the common Squirrel. The appearance of the ear is carefully represented in the figure. The interior portion is large and naked, and the helix is narrow, and closely applied to the head. The feet present nothing peculiar, and the muzzle is short and thick.

The height of our animal is three inches and a half. From the root of the tail

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to the tip of the nose, it measures seven inches and a half, and the tail is as long as the body and neck together.

The Bokkol is a rare animal in Java. I met with it once only in the forests of Blambangan, in the year 1806, and a drawing of it was then prepared. The specimen, which was collected at the same period, has been deposited in the Museum of the Honourable East India Company, and has been before me in arranging the preceding description. The Drawing of the figure which illustrates this article, was already in the hands of the engraver when the 34th Number of M. Fréd Cuvier's *Mammiferes Lithographisées* reached this country. He has given the name used by the natives of Sumatra; and his specific name, by which it will be introduced into the systems, is placed at the head of this article. It may be presumed to be a rare animal in Sumatra as well as in Java, as it is not contained in the Catalogue of a Zoological Collection of Sir Stamford Raffles, printed in the Thirteenth Volume of the Transactions of the Linnean Society.



SCIURUS PLANTANI.

Drawn by W. Daniell

London, Published by Kingsbury, Parbury & Allen, Leadenhall Street, Oct. 1859.

Engraved by T. Agnew & Sons.

SCIURUS PLANTANI.



ORD. IV^{me} RONGEURS, *Cuvier*. 1^{re} Division.

ORD. IV. GLIRES, *Linn.* Syst.

ORD. IV. PRENSICULANTIA, *Illiger*, Fam. 9, Agilia.

SCIURUS, *Linn. Briss. Erxleb. Bodd. Cuv. Geoff. Illig. &c.*

CHAR. GEN.—*Dentium formula*; *Primores* $\frac{2}{2}$, *Molares* $\frac{5-5}{4-4}$. *Primores* superiores pagina antica læves, inferiores admodum compressi acuti. Pro *Laniariis* diastema. *Molares* abrupti obducti tritores, supra antico accessorio. *Rostrum* acutum. *Labrum* fissum. *Sacculi buccales* nulli. *Auriculæ* oblongæ, penicillatæ vel rotundatæ, simplices. *Cauda* elongata villosa, compressiusculo-disticha vel cylindrica. *Mammæ* apertæ.



* *Cauda disticha.*

Sciurus supra fulvo fuscoque varius, subtus circulo oculos cingente strigaeque utrinque laterali fulvis, cauda corpore paululum longiore nigro annulata.

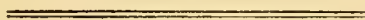
Bajing, of the Javanese and Malays.

Plantane Squirrel, *Pennant's Hist. of Quadr. Second Edition*, 1781. II. p. 416. n. 281.—*Third Ed.* II. p. 151. n. 348. *Shaw's Zool.* II. 148.

Sciurus Plantani, *Sven Ingemar Ljung. Kongl. Vetensk. Acad. nya. Handl.* XXII. 1801. p. 99. *Widemann's Archiv*, III. 2. p. 249.

Sciurus notatus, *Boddaert Elen. anim.* I. p. 119.

Sciurus bilineatus, *Geoff. Collect. du Mus. Desmar. nouv. Dict. d'Hist. nat. tom. 10*, p. 106. *Desmar. Encycl. Method. Mammalog.* p. 336.



THE first notice of the animal which has been selected for this article, was communicated to the Public by Mr. Pennant, in the year 1781, in the second edition of his History of Quadrupeds. He applies the name of Plantane Squirrel to it,

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and states that it is common in Java and Prince's Island, and called by the Malays, Ba-djing. It does not appear whence Mr. Pennant's information was obtained; but the name is spelled according to the orthography used in the Dutch language. His description, although concise, distinctly characterizes our animal. In the year 1784, Captain *Joh. Brandes*, who visited Batavia, in a Swedish vessel, had an opportunity of examining the Javanese Bajing; and a description of it, illustrated by a plain engraving, was published, from his communications in the XXII^d Volume of the Swedish Transactions, by Mr. S. I. Ljung. The name of *SCIURUS PLANTANI* was now applied to it, which, although perhaps objectionable in its formation, has been preserved; but the publication of a Drawing, from the specimens in the Honourable East India Company's Museum, in which the colours are accurately exhibited, has not been rendered useless by Captain Brandes' figure, which in this country can rarely be consulted. Boddaert, about the same period, described the Plantane Squirrel, from Mr. Pennant's materials, in his *Elenchus Animalium*, and named it *Sciurus notatus*.

The next notice of our animal is given in the Catalogue of the Museum of Paris, by M. Geoffroy St. Hilaire, from specimens collected in Java by M. Leschenault de Latour. It here receives the name of *bilineatus*; but as the sides are marked with a single line, it conveys an erroneous idea of our animal, when compared with the *Sc. bivittatus*, which has two lines on each side. I have therefore preferred the name of M. Ljung, as the most ancient, and as recording the name first employed by Mr. Pennant.

The *Sciurus Plantani* was one of the first quadrupeds which I observed in Java, and a concise notice of it was contained in a Manuscript Catalogue of a Zoological Collection, which was sent to England in the year 1812. Several other *Sciuri* from that Island are now arranged in the Museum of the Company, together with the species forwarded from Sumatra by Sir Stamford Raffles. To these the discoveries of Dr. George Finlayson, who accompanied John Crawfurd, Esq. in his mission to Siam, in this genus, have recently been added. These materials afford several new species to the systematic Catalogues; and the comparisons connected with the examination of them, have led me to a general review of the Indian *Sciuri*. Several of these are illustrated by the manuscript remarks, and by the drawings of Dr. Francis Hamilton, which are deposited in the East India Company's Library, the free use of which he has, with the most gentlemanly liberality, afforded to me.

The result of my inquiries will appear after the description of the *Sciurus*

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Plantani, in a general enumeration of Indian Sciuri. The history and characters of several of these still require further observations, and the comparison of good specimens, with authentic descriptions made in the native countries. The varieties to which several of them are subject, have, in a few cases, led to an erroneous multiplication of species; but while the examination of the numerous animals belonging to this genus is extended, several, as yet doubtful subjects, will probably be shewn to be really distinct species.

The entire length of the *Sciurus Plantani* is seven inches. Many individuals that I examined, measure only six inches and an half. The tail is a little longer than the body and head together. The covering above is delicately variegated; the separate hairs, as in several other Squirrels, are marked with alternate bands of tawny and brown, by which a beautiful mixture is produced. The same colour also covers the head, the extremities exteriorly, and the sides of the body, under the line which characterizes this species; it is more intense on the tip of the nose. The under parts of the head, neck, body, and extremities, are fulvous, with a considerable brilliancy of tint. The same tint also marks a circle around the eyes, a line extending from the shoulder to the thigh along the sides of the body, and the cheeks and upper lip; along the under side of the tail it is gradually blended with the colour of the upper parts. The tail is regularly marked above with narrow transverse bands of a dark brown colour, alternating with the same mixture of tawny and brown that covers the upper parts. It is terminated by long hairs of a tawny hue, in which the bands are indistinctly perceptible. The under parts are, in some cases, of a paler tint: the individual described by M. S. I. Ljung was white underneath. The eyes are vivid and prominent. The front teeth in the lower jaw are comparatively acute and lengthened.

Numerous long, stiff bristles, of a black colour, arise from the upper lip and from the sides of the nose; a few shorter bristles are thinly scattered on the cheeks. The ears occupy a considerable space on the sides of the head; the lobes are large and erect, with an inflected margin; they are without the tuft of long hairs which decorates several Sciuri. The hairy covering is thick, and closely applied to the skin; the separate hairs are of moderate length, downy at the base, and, especially underneath, very delicate and soft to the touch. The anterior extremities have, in place of a thumb, a minute warty protuberance, which is scarcely perceptible; the structure of the feet and toes, in other respects, agrees with that of other Squirrels. In M. Ljung's account of our animal, the feet are erroneously characterized as four-toed in all the extremities. The name of *Sury-Cat* which it has at Batavia, and which by the Dutch is also given to the *Ryzæna* or *Suricata*, found at the Cape of Good Hope, has probably given rise to this mistake.

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Of all the quadrupeds found in Java, the Bajing is perhaps the most abundant. It inhabits both the sea-coast, and those districts of the interior that are but little elevated above the level of the ocean. All these are very productive of the Plantane or Banana, from resorting to which Mr. Pennant has taken his specific name, and he describes it as clattering over the dried leaves with vast noise. It is also found on the Tamarind tree, and on fruit-trees in general; but it is more particularly notorious on account of the injury which it occasions to the Cocoa-nut tree. The pursuit and destruction of the Bajing become a necessary task to the natives, as the preservation of fruits in general, and particularly of the Cocoa-nut, in a great measure depends on it. This tree, in many parts of the Island, affords the principal revenue to the peasants and proprietors of plantations, and, next to rice, is, in this climate, perhaps the most useful production of the vegetable kingdom. The enumeration of its various uses, both in the diet and in the domestic economy of the natives, would afford matter for an extensive essay. The natives are therefore frequently found engaged in the chase of the Bajing; and the remains of it are sometimes exhibited in numerous skins suspended about their dwellings. The diminution of the numbers of the Gray Squirrel, in America, was in former times thought worthy of the notice of Government, and a small premium was paid for each skin: a similar measure might be recommended in Java, for the protection of the peasant and landholder. The *Sciurus Plantani* increases perhaps more rapidly than Squirrels in northern climates. Its food, in a temperate and fertile region, is always abundant, and its numbers are never checked by the frosts of a severe winter.

The *Sciurus Plantani* has the manners of Squirrels in general; it lives on trees, and constructs, as in other countries, a simple nest, with various vegetable materials; but the Cocoa-nut tree, which, by its fruit, attracts our animal, rarely affords it a permanent residence, as the constant visits of the natives to the summit, for the collection of the fruit, enable them to dislodge this injurious intruder. The Bajing is capable of the same degree of domestication with most other Squirrels: it is often found perfectly tamed, both at liberty and confined in cages, in the dwellings of native or European residents in Java.

In the peculiarities of its organization, the Bajing agrees with other *Sciuri*. The form of the head, the structure of the teeth, and the number and character of the toes, present nothing peculiar. The tail has the form of a compressed cylinder; but the hairs are shorter, and spread less to the sides, than in the European, and in several American Squirrels. The peculiar structure of the tail, according to which M. Desmarest has divided this genus into two sections, has been exhibited in the description of the *Sciurus insignis*. The external marks on the body afford

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likewise a character for dividing Squirrels into two groups : according to these, I shall now attempt a general list of Indian Squirrels. I shall first enumerate those in which the body is marked, either laterally or above, with longitudinal lines or streaks ; these form one section :—in the second, the upper and under parts present a considerable contrast in colour ; the former are uniformly of a dark, and the latter of a light tint. Between these, a new species, from Siam, may be placed, in which the colour is uniform throughout.

I shall commence the Catalogue with the subject described in this article ; after which a new species from Java will be placed, which has been named *nigrovittatus* : several other species follow, which are marked with lateral striæ ; and then those in which the striæ are disposed along the back. The series will be completed by those animals in which the upper and lower parts differ more strikingly in colour.

GENERAL ENUMERATION OF INDIAN SCIURI.

1. SCIURUS PLANTANI, *Pennant, Ljung*, 1781, 1784.

Sc. supra fulvo fuscoque varius, subtus circulo oculos cingente strigaeque utrinque laterali fulvis, cauda corpore paululum longiore nigro annulata.

Native place, the Island of Java.

Described from specimens in the Honourable East India Company's Museum.

2. SCIURUS NIGROVITTATUS, *Nobis*, 1803.

Sc. supra fulvo griseo fuscoque saturato varius, margine abdominali circuloque oculos cingente pallidioribus, subtus canus, striga laterali nigra, cauda corpore longiore nigro annulata.

This species agrees with the former in the distribution of the external marks ; but it is somewhat larger in size, and, as far as I have observed, less abundant in Java. It has also, above, a darker tint ; and the under side is gray, with a blueish cast : the transverse bands of the tail are broader, and more strongly marked. The black line along the sides affords a clear specific distinction.

Native place, the Island of Java.

Museum of the East India Company.

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3. SCIURUS ALBOVITTATUS, *Desmar.*

Sc. supra testaceo rufescens striga utrinque laterali alba, subtus albus, cauda basi cylindrica apice disticha nigro alboque varia, unguibus longis compressis parum arcuatis.

M. Desmarest has given the character, accompanied by a description, from specimens brought from the Cape of Good Hope, by M. Delalande. He considers as a variety, the Squirrel which was found by Sonnerat, in the vicinity of Gingi, near Pondichery; and which was distinguished, in the systematic Catalogues, by the name of

Ecureuil de Gingi, *Sonn. Voy.* 2. p. 140, pl. 89.

Sciurus dschinschicus, *Linn. Syst. Ed. Gmel.* I. p. 151.

Sciurus Ginginianus, *Shaw's Zool.* II. p. 147.

Gingi Squirrel, *Pennant's Hist. of Quadr.* II. p. 141.

4. SCIURUS BIVITTATUS, *Raffles, Desmar.*

Sc. supra nigrescente fulvoque varius, subtus clare rufo nitens, lateribus utrinque strigis duabus contiguis superiore alba inferiore nigra, cauda cylindrica flavo variegata apice rufa.

Tupai, of the Malays in Sumatra.

Sciurus vittatus, *Sir T. S. Raffles's Cat. of a Zool. Col. made in Sumatra, Tr. Linn. Soc.* XIII. p. 259.

Sciurus bivittatus, *Desmar. Encycl. Method. Mammalog.* p. 543. *Suppl.*

Ecureuil toupaye, *Fréd. Cuv. Mamm. Lithogr.* 33^e livraison.

The first account of this species was given by Sir Stamford Raffles, in his description of a Zoological Collection made in Sumatra. The figure of M. Fréd. Cuvier, in the above cited work, affords a good representation of this animal, from a drawing made on the same Island. Dr. Finlayson found it in Pulo-Penang and in Malacca. It is therefore pretty generally distributed through the Indian Archipelago.

Museum of the East India Company.

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5. SCIURUS INSIGNIS, *Desmar.*

Sc. fuscus griseo variegatus, subtus albidus, striis tribus nigris longitudinalibus, hypochondriis femoribusque tænia ferruginea diffusa lateribus colli et abdominis angusta notatis.

Bokkol, of the Javanese.

Lary, of the Natives of Sumatra.

Sciurus insignis, LE LARY, *Fréd. Cuv. Mamm. lithogr.* 34^{me} Livr.

Sciurus insignis, *Desmar. Encycl. Method. Mammalog. p. 544. Horsf. Zool. Res. in Java, &c. No. 5.*

Native place, the Island of Java. Observed in 1806.

Museum of the East India Company.

6. SCIURUS PALMARUM, *Linn.*

Sc. supra griseo fuscoque varius striis tribus flavicantibus, subtus albus, cauda supra rufescente subtus albida, pilis nigris varia.

Ecureuil Palmiste *vulgairement* Rat Palmiste, *Briss. Regn. anim. p. 156. n. 10.*

Mustela africana, *Clus. exot. p. 112. c. fig. Ionst. Quadr. p. 106. Eus. nieremb. Hist. Nat. lib. IX. cap. 32. p. 172. c. fig. Raii syn. quadr. p. 230.*

Le Palmiste, *Buff. Hist. Nat. tom. X. p. 126, t. 26.*

Palm Squirrel, *Penn. Hist. Quadr. Ed. 3. II. 149.*

Sciurus Palmarum, *Linn. Syst. Ed. Gmel. I. p. 149. Shaw's Zool. II. p. 146. Desmar. Encycl. Mammalog. p. 336.*

Das Palmen Eichhorn, *Schreber Säugth. IV. p. 802. Tab. CCXX.*

Sciurus penicellatus, *Leach. Zool. Misc. I. p. 6. Tab. 1.*

Native place, continental India.

Museum of Joseph Sabine, Esq. London.

7. SCIURUS FINLAYSONII, *Nobis.*

Sc. lacteus dorso flavescente, oculis vibrissis palmis plantisque nigris, cauda pilis nigris raris interspersa.

Ecureuil blanc de Siam, *Buff. Hist. Nat. VII. p. 256.*

This species is dedicated to the memory of Dr. George Finlayson, (of His Majesty's 59th Regiment,) the naturalist, who accompanied John Crawford, Esq. in

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his mission to Siam and Cochin-China. An interesting collection of quadrupeds, birds, and other objects of Natural History, the result of his meritorious labours during the visit of the mission to those countries, has been deposited in the Museum of the Honourable East India Company; and I have introduced the new species discovered by Dr. Finlayson, in this Catalogue of Indian Sciuri. These materials have also afforded the means of comparing several species previously described.

Dr. Finlayson embarked for Europe, in the ship the General Hewett, soon after his return to Calcutta, in charge of the Collections. His health was in a precarious state, from the effects of an Indian climate; and we have to lament that he did not live to return to his native country.

This species has hitherto been mentioned by Buffon alone, from the following concise notice in P. Tachard's Travels. "Nous y (at Lonpeen, a village situated in the extensive forests of Siam) vimes aussi des Ecureuils, qui ont le poil parfaitement blanc et la peau tres-noire."—Second Voyage du P. Tachard, Paris, 1689, p. 249.

The following description is extracted from Dr. Finlayson's manuscripts:—"The head and body yellowish white; the head round; the cheeks full; the nose large; the ears large, plain, not tufted; the iris dark brown; the whiskers long and black; the tail bushy, interspersed with black hairs, and tufted; palms of the feet black. This is an elegant, lively, and active species of Squirrel, almost perfectly white. The body is about seven inches in length, and the tail is equal in length to the body. The eyes are black and lively; and the animal, though white, has not the leucæthiopic habit common in the animals of Siam. It frequents large trees, feeds on their bark and fruit, and is generally seen upon a tall species of Aleurites. One of the specimens was shot by Lieut. Rutherford, on the Islands called Sichang, in the Gulf of Siam."

Museum of the East India Company.

8. SCIURUS AFFINIS, *Raffles*.

Sc. corpore supra cano fuscoque vario, subtus capite caudæque apice canis, tænia laterali fulvescente, cauda fusco fasciata.

Sciurus affinis, Sir T. S. Raffles's *Cat. of a Zool. Coll. made in Sumatra*, Tr. Linn. Soc. XIII. p. 259.

The hairy covering of the upper parts is fulvous brown, with a cast of gray; it is variegated with delicate transverse bands. The whole of the head, the

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under parts throughout, and the extremity of the tail, are gray. This latter organ is cylindrical, somewhat distended in the middle, and then tapering to a point; the transverse bands are irregular. Between the tints of the sides and abdomen, a stripe of reddish brown intervenes, which is continued to the neck. The whiskers consist of black and white hairs intermixed. The ears are rounded above, and without any brush-like appendage. The length of the body and head is nine, and of the tail seven inches.

Sir Stamford Raffles discovered this species in 1819, in the woods of Singapore. One specimen, from Pulo Panjang, in the Gulf of Siam, is contained in Dr. Finlayson's Collection. This specimen is somewhat smaller than the *Sciurus bicolor*, to which Sir Stamford compares the size of the *Sciurus affinis*, as it is observed in Singapore.

Museum of the East India Company.

9. SCIURUS TENUIS, *Nobis*.

Sc. supra fulvo saturato nigroque tenuissime varius, margine laterali fulvescente, subtus flavicante cinereus, cauda fulva nigro fasciata.

The entire length of the body and head is five inches and an half, and of the tail five inches. It differs from the *affinis* in size, and in having generally a darker tint. The covering above is uniformly and delicately variegated with dark tawny and blackish brown; towards the sides the tint becomes fulvous, with some lustre, but no defined line or streak is apparent. The sides of the head and neck have the same colour. The under parts of the neck and abdomen, and the extremities interiorly, are pale yellowish gray, with a slight tint of fulvous. The tail above is gray, with obscure black bands, and irregular tawny specks; it has the same form as in the *Sc. affinis*, being narrow at the base, broader in the middle, and terminated by a long, attenuated, grayish tuft, which is obscurely banded with black. The separate hairs covering the tail have a band of a fulvous colour at the base, of black in the middle, and of gray at the extremity.

Native place, Singapore.

Museum of the East India Company, from Dr. Finlayson's Collection.

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10. SCIURUS ERYTHRÆUS, *Pallas*.

Sc. supra ex flavo et fusco mistus, infra ex sanguineo fulvus, auriculis ciliatis, cauda ex sanguineo fulva. *Gmel.*

Das rothbäuchige Eichhorn, *Schreb. Säugth.*

Ruddy Squirrel, *Penn. Quad. II. 143.*

This species is only known by the account of Pallas; and as this is concise, I shall give it in his own words.

“ Descriptum specimen magnitudine erat Sciuri vulgaris, vel paulo forte majus. Color corporis fere qui in Cavia Aguti observatur, luteo fuscoque mixti pilis; subtus longitudinaliter sanguineo fulvus seu saturatissime rufus. Idem color est caudæ tereti-villosæ, et quam fascia superne longitudinalis nigricans legit. Palmæ tetradactylæ, verruca insignis, loco pollicis notatæ. Plantæ pentadactylæ. Auriculæ subbarbatæ.”—*Pallas glir. p. 377.*

Native place, according to Pallas, East India.

11. SCIURUS BICOLOR, *Sparrmann*.

Sc. supra niger, infra fulvus, auriculis acutis imberbibus, palmarum ungue pollicari magno rotundato.

Sciurus bicolor, *Andreas Sparrmann, Götheborgska Handlingar. Wetenskap St. I. p. 70. 1778. Linn. Syst. Ed. Gmel. I. p. 148. Desmar. Encycl. Mammalog. p. 336.*

Javan Squirrel, *Penn. Hist. Quadr. II. 409, Ed. 3. II. 142. Shaw's Zool. II. p. 130.*

Das Javanische Eichhorn, *Schreb. Säugth. p. 781. Tab. CCXVI.*

The description of Sparrmann appears to have been made from a young animal: he gives twelve inches to the length of the body, and as much to the tail. The adult is considerably larger: two specimens in the Honourable Company's Museum might be considered as belonging to a distinct species, were the subject not illustrated by the following observation of Sir Stamford Raffles. “A young male,” he says, “of the *S. bicolor*, procured from the Straits of Sunda, had the whole of the tail of the same

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fulvous colour as the belly, while in adult ones it is entirely black." A very concise and correct description of this animal, by Dr. Francis Hamilton, is preserved in the Library at the India House. "*Sciurus bicolor* : saw a live one lately taken in the woods. The extreme length is about a yard, three-fifths of which are occupied by the tail. The body above, and all the tail, are black, with long, harsh, shaggy hair. On the loins the tips of the hair have a reddish chestnut hue. The throat, breast, belly, inside of the thighs, and fore legs are tawny, with softer hair. The fore feet are black, with very short thumbs. The hind legs and feet are black. The tail is depressed, that is to say, the hair is turned towards the two sides. The ears are short, plain, hairy, rather round at the end, with a sharp edge." Hamilton's Manuscripts. —This description agrees exactly with several specimens in the Museum at the India House, from Dr. Finlayson's Collection.

Native place, continental India, Siam, and the Eastern Archipelago.

12. SCIURUS LESCHENAULTII, *Desmar.*

Sc. supra fuscus, capite gula ventre antipedumque parte anteriore et interiore flavicantibus, cauda supra fusca subtus flava.

Jelarang, of the Javanese.

Sciurus albiceps, *Geoff. Coll. du Mus. Desmar. nouv. Diction. d'Hist. 2^e Ed. tom. 10. pag. 105.*

Length, from the root of the tail to the tip of the nose, fifteen inches; tail of the same length. The external covering of this species is subject to greater variations than that of any other of the Indian Squirrels that I am acquainted with. Of the numerous specimens contained in the Museum at the India House, some are pale yellow, others deep brown. In several the colour is uniform; in others it is distributed in irregular patches of different shades; but the separate hairs are not variegated or banded, as in many of the species above enumerated. The darker specimens have some resemblance to the *Sciurus bicolor*; but the examination of numerous specimens has convinced me that these two species are decidedly distinct. The tint, in the *bicolor*, is of the deepest black, and the tail, in the adult specimens, is always uniform with the body. In the *Sciurus Leschenaultii*, the tail, in adult specimens, is often gray or yellowish, and it has a different form and termination. Our species is likewise readily distinguished by its figure and habits.

It is found abundantly in Java.

Museum of the East India Company.

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13. SCIURUS PREVOSTII, *Desmar.*

Sc. supra niger, subtus badius, lateribus flavis, cauda fusca.

Sciurus Prevostii, *Desmar. Encycl. Mammalog. p. 385.*

Size of the European Squirrel. Described by M. Desmarest, from a specimen in the collection of Natural History of Brest. It differs from the *Sciurus bicolor*, with which it might be confounded in size, and in a defined streak along the sides.

Native place, India.

14. SCIURUS HYPOLEUCOS, *Nobis.*

Sc. supra testaceus margine laterali fulvo, subtus fronte lateribusque capitis albis, cauda corpore longiore testaceo fuscescente apice flavicante.

General colour of the upper parts, and of the legs exteriorly, testaceous brown, surrounded on the flanks, neck, and along the thighs, with a border of a paler, nearly fulvous tint. On the summit of the head the colour is mixed with gray; on the tail, above, it becomes darker, inclining to brown; underneath, this organ is marked with a line of a lighter tint, and the tip is yellowish. The throat, the sides of the head, the cheeks, the under parts of the neck, body, and thighs, are pure white. The anterior thighs are fringed with a border of delicate hair. The ears are of moderate length, acute, and without any tuft at the extremity. The nose and forehead are gray; the whiskers very long and black: a few separate bristles arise from the cheeks.

This species equals in size the largest Squirrel hitherto discovered. The length of the head and body is full fifteen inches, and of the tail, about seventeen. It is of a robust habit; the tail is compressed or two-sided, but less bushy than in the *Sc. maximus*.

It is a native of Sumatra, whence it was forwarded to the Honourable Company's Museum by Sir Stamford Raffles.

Museum of the East India Company.

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15. SCIURUS MACROURUS, *Pennant*.

Sc. capite dorsoque supra nigris, subtus flavus, cauda grisea.

Sciurus zeylonicus, pilis in dorso nigricantibus, Rukkaia dictus. *Raii syn. Quad.*
p. 215.

Sciurus macrourus, long-tailed Squirrel. *Penn. Ind. Zool. tab.* 1. *Erxleb. mamm.*
p. 420. *Linn. Syst. Ed. Gmel. p.* 148. *Shaw's Zool.* II. *p.* 129. *Desmar. Encycl.*
Mammalog. p. 335.

Sciurus Ceilonensis, *Bodd. Elen. anim. p.* 117.

Ceylon Squirrel, *Penn. Hist. Quad. 2d Ed. p.* 408.

Das langschwänzige Eichhorn, *Schreb. Säugth. IV. p.* 783. *t.* CCXVII.

Dandoelana or *Roekea*, of the inhabitants of Ceylon.

This species was first defined by Mr. Pennant in his *Indian Zoology*, from a drawing prepared for John Gideon Loten, Esq. formerly a Governor of one of the Dutch establishments in Ceylon. This drawing exhibits an animal similar, in all points relating to form and proportion, to the *Sciurus maximus* of Gmelin, the Grand Ecureuil de la côte du Malabar, of Sonnerat; it differs in colour and in some peculiarities of the external marks; and on the accuracy with which these are represented, depends the final determination, whether the Long-tailed Squirrel of Pennant be a distinct species. M. Cuvier observes, that it is sufficient to compare the figures of Pennant and Sonnerat, to determine that they represent the same animal; but M. Desmarest, after having adopted this opinion, has determined, in the arrangement of the species, in the article *Mammalogie* of the *Encyclopedia*, to separate them again, on the ground of the difference of colour, until further elucidations should be obtained on this subject.

As I have been favoured with an opportunity of examining the original drawing of the Long-tailed Squirrel, which, with a general series of drawings of subjects of Natural History, prepared under the superintendence of Governor Loten, is now deposited in the Library of the late Sir Joseph Banks, I am enabled to attest the accuracy of Mr. Pennant's description; and, in order to afford a comparison with a drawing which will be referred to in the account of *Sciurus maximus*, I shall concisely detail the peculiarities which tend to confirm the distinct character of the *Sciurus macrourus*. The line extending transversely from the ears across the cheeks to the neck, which, judging from the drawings and descriptions, is single in the *Sciurus maximus*, is represented *double* in Governor Loten's drawing;

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the head above, and all the upper parts, the thighs, and the biparted line on the cheeks, are black with a cast of deep blue; the under parts are yellow, of a light tint; the tail is light gray; the nose flesh-coloured, and the feet black; between the ears a white band stretches across the head. Both species agree in having the ears tufted with long black hairs.

From a drawing prepared in Ceylon for J. G. Loten, Esq. preserved in the Banksian Library.

16. SCIURUS MAXIMUS, *Gmel.*

Sc. capite colloque supra dorso lateribus fascia transversa genum pedibusque ex rubicundo fuscis, armis femoribus tergo uropygio caudaque præter apicem nigris, subtus fascia occipitali caudaque apice flavicantibus, genis sordide fulvis.

Rasoo, of the people who inhabit the Ratufar hills: Dr. Francis Hamilton's MS.

Le grand Ecureuil de la Côte de Malabar, *Sonnerat Voyag. tom. 2. pag. 139. pl. 87.*

Buffon Hist. Nat. Suppl. VII. p. 254, pl. LXII.

Sciurus indicus, *Erxleb. mamm. p. 420, (1777.) Linn. Syst. Ed. Gmel. 149.*

Sciurus purpureus, *Zimm. Zool. Geogr. quadr. p. 518, (1777.)*

Sciurus bombayus, *Bodd. Elen. anim. p. 118, (1785.)*

Sciurus maximus, *Linn. Syst. Ed. Gmel. p. 149, excluso charactero specifico, (1788.)*

Desmar. Encycl. Mammalog. p. 334.

Malabar Squirrel, *Penn. Hist. Quadr. Ed. 3. II. p. 141.*

Bombay Squirrel, *Penn. Syn. Quadr. p. 281. Hist. Quadr. II. p. 409. Ed. 3, II. p. 143. Shaw's Zool. II. p. 133.*

Great Squirrel, *Shaw's Zool. II. p. 127.*

Das malabarische Eichhorn, *Schreb. Säugth. p. 784. T. CCXVII. B.*

Das Eichhorn von Bombay, *Schreb. Säugth. p. 786.*

This species, which has been named, by way of distinction, the Great Squirrel, is only equalled by the *Sciurus hypoleucos*. The first description of it is given by M. Sonnerat, in the second Volume of his Travels, with the name of grand Ecureuil de la côte de Malabar: he also communicated to the celebrated Buffon, a prepared skin of an Indian Squirrel, the description of which, by the Count La Cépède, contained in the VIIth Volume of the Supplement to the Natural History, agrees in all points with this animal. Various specific names have been applied to it

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by systematic writers, and the character is not defined by them with sufficient clearness. That of Erxleben is too concise to distinguish it from the allied species; Gmelin erroneously defines it "black underneath." The Bombay Squirrel of Mr. Pennant, described from a skin in Dr. Hunter's Cabinet, is, in my opinion, the same with his Malabar Squirrel, which he has named and described according to Sonnerat.

The descriptions of the *Sciurus maximus*, given by Sonnerat and La Cépède, are illustrated and confirmed by an excellent drawing, presented by Dr. Hamilton to the Library of the East India Company; and, as his MS. notes on Indian Quadrupeds and Birds contain a concise description of this animal, made from a living subject, I shall, with his kind consent, extract it in his own words:—"The upper parts of the neck, back and sides, and the legs and feet are dark reddish-brown. The shoulders, the rump, and the hinder parts of the back and thighs are black. The nose and lips are of a dirty flesh colour. The cheeks and the circumference of the eyes are dirty brown. The fore part of the face is very dark reddish-brown. The ears are short and round, and are covered with bright reddish-brown hairs, which form a tuft longer than the ear itself. Between the ears is a broad pale-yellow band. From the ears down to the cheeks there runs a vertical reddish-brown line. The throat, the fore and inside of the fore legs, the breast, the belly, and the fore and inside of the hinder thighs are yellow. Between the upper lip, and before and behind each ear, it has very long and strong black whiskers. The irides are dark brown. The tail, on the upper part and sides, is covered with very long close hair, which may be made to stand nearly erect. They are black every where except the tip, which is dirty yellow or white. The under side of the tail is covered with short hair. The hair on the body is long and harsh." Hamilton's MS.



1 Foot

SCIURUS BICOLOR.

Drawn by W. Daniell.

Engraved by W. Taylor.

London, Published by Kingsbury, Tait & Allen, Leadenhall Street, April 1824.

SCIURUS BICOLOR.

ORD. IV^{me} RONGEURS, *Cuvier*. 1^{re} Division.

ORD. IV. GLIRES, *Linn. Syst.*

ORD. IV. PRENSICULANTIA, *Illiger*, Fam. 9, Agilia.

SCIURUS, *Linn. Briss. Erxleb. Bodd. Cuv. Geoff. Illig. &c.*

CHAR. GEN.—*Dentium formula*; *Primores* $\frac{2}{2}$, *Molares* $\frac{5-5}{4-4}$. *Primores* superiores pagina antica læves, inferiores admodum compressi acuti. Pro *Laniariis* diastema. *Molares* abrupti obducti tritores, supra antico accessorio.

Rostrum acutum. *Labrum* fissum. *Sacculi buccales* nulli. *Auriculæ* oblongæ, penicillatæ vel rotundatæ, simplices.

Cauda elongata villosa, compressiusculo-disticha vel cylindrica. *Mammæ* apertæ.

Pedes distincti ambulatorii, antici digitis quatuor et verruca pollicari lamnata, postici pentadactyli. *Ungues* falculares. *Illiger*.

* *Cauda disticha.*

Sciurus supra niger, infra fulvus, auriculis acutis imberbibus, palmarum ungue pollicari magno rotundato.

Jelarang, of the Javanese.

Sciurus bicolor, *Andreas Sparrmann, Götheborgska Handlingar. Wetenskap St. I. p. 70. 1778. Linn. Syst. Ed. Gmel. I. p. 148. Desmar. Encycl. Mammalog. p. 336.*

Javan Squirrel, *Penn. Hist. Quadr. II. 409. Ed. 3. II. 142. Shaw's Zool. II. p. 130.*

Das Javanische Eichhorn, *Schreb. Säugth. p. 781. Tab. CCXVI.*

Var. β in insula Java frequentissima.

Sc. supra fuscus, varians a fusco-nigricante ad sordide fulvum, pilis velleris fulvis et canescentibus intermixtis, subtus fulvus vel pallide flavescens.

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THE Plate annexed to this Article exhibits the *Sciurus bicolor*, in its common dress, in the eastern parts of Java. On the Continent of India and in Cochin-China it is found, almost uniformly, black above, and golden yellow underneath. The specimen from which the first description was published by Sparrmann, in the Transactions of the Gotheburg Society, for the year 1778, had the same external marks. This was procured alive in Java, probably in the western districts, at Batavia or at Anjerpoint, by the crew of a Swedish East India ship, and afterwards formed part of the Museum of M. Staaf, Œconomie-director in Gotheburg. The diversity which exists in the hairy covering of the *Sciurus bicolor*, in the eastern parts of Java, where I chiefly observed it, gives rise to a variety in this species, of very irregular shades of colour, which it is now my object to describe. For an account of the common external appearance of the *Sciurus bicolor*, in the Indian Peninsula, I refer to the extract given from Dr. Hamilton's Manuscripts, in the VIIth Number of these Researches. The specimens sent from Cochin-China by Dr. Finlayson, have the same external character.

The entire length of the *Sciurus bicolor*, in Java, from the tip of the nose to the extremity of the tail, is three feet; of this the tail comprises rather more than one half. These are also its dimensions both in India and in Cochin-China. The subject described by Sparrmann measured only twelve inches from the extremity of the nose to the root of the tail. In the specimens collected by me in the eastern parts of Java, the upper parts of the head and neck, the entire back, the sides of the body, and the limbs above, are dark coloured; but the tint varies from intense brown to tawny, and often passes into yellowish gray. The separate hairs composing the fur have either a uniform dark tint, or are dark only at the base, and yellowish at the extremity. According to the distribution of these hairs, the external coat of our animal receives its character. The surface is either uniformly dark coloured, or it is marked with irregular tawny discolourations, of different shades of intensity, appearing in broad transverse bands, or in patches of various extent. It is, in most specimens, dark and uniform on the sides of the neck, the shoulders, the upper parts of the legs and feet, the tip of the nose, and the root of the tail; but it varies in different individuals from very deep blackish-brown to chestnut and to reddish-brown. A ring of the same intense colour also surrounds the eyes. Between the eyes and ears a band of a paler tint commences, which in many cases extends across the head, and spreads over the vertex and anterior part of the neck, so as to give the animal the appearance of having a white head. This pale discolouration is however not uniform.

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It is more observable in the tawny specimens, and sometimes only occupies a small space between the ears and the adjoining portion of the forehead.

The under parts, in our variety of the *Sciurus bicolor*, are generally yellow; but the tint varies from a deep golden or fulvous to a light sulphureous, often passing into Isabella-yellow. A defined line, of more intense hue, separates the dark colour of the upper parts from the lighter tint of the lower, and in the external marks, exhibits an approach to those species in which the sides are striated. The tint of the light-coloured under parts commences at the extremity of the lower mandible, and, including the throat, rises laterally, so as to embrace the cheeks, to meet the boundary of the eyes, and to unite with the broad band which transversely crosses the head. It then passes to the sides of the body in a line, commencing at the axillæ, and pursuing a regular course to the thighs. It spreads over the interior surface of the fore legs, being separated from the dark upper parts by a well-defined boundary. It also occupies the interior of the hind legs; but the separation is less distinctly marked, and in some specimens the dark tint spreads over the whole of the thighs and legs. The tail is dark at the base only, and in the remainder of its length agrees with the under parts.

In several specimens the tawny colour predominates throughout, and only small patches of brown appear on the shoulders, the sides of the neck, and the base of the tail, and in a few instances the colour of the upper parts is Isabella-yellow, with a grayish cast, while the under parts are pale yellow, and scarcely any distinction of colour is apparent above and underneath. These specimens differ greatly from the *Sciurus bicolor* described by Sparrmann; and without the illustration afforded by a numerous series, would be considered a distinct species.

The ears are acute, of moderate size, covered with delicate hairs, and without any brushlike appendages. The mustaches consist of numerous long, stiff, bristly hairs, arising from the sides of the nose and the upper lips, and diverging from the head. A small tuft of separate, short, stiff, black whiskers, pointing backward, arises from the cheeks, about midway between the angle of the mouth and the ears. The front teeth have a gallstone yellow tint, inclining to orange: the upper lip is deeply divided. In its general habit, as well as in the form of the head, and in the proportions of the neck and limbs, the *Sciurus bicolor* agrees with the other large Indian Squirrels, and like these it also has a short, broad, obtuse nail on the thumb, which has been aptly compared to that of several Monkeys.

SCIURUS BICOLOR.

The thumb itself is not lengthened or separated from the toes, but consists of a thick fleshy tubercle, supporting the nail. The claws on the other toes of the fore feet, and all the claws on the hind feet, are acute and greatly compressed, as in other Squirrels.

The hairy covering on the upper parts is coarse. At the base the separate hairs are supplied with down, but they are rigid, and somewhat bristly at the extremity, and are not regularly applied to the skin; on the breast and abdomen the fur has a softer texture, and the arms and hands are bordered with a beautiful series of hairs, which generally have a deep fulvous tint, and extend laterally from the shoulders towards the ears. The separation between the bristly hairs of the upper parts and the softer fur underneath, is strongly indicated by a line, arising from an abrupt termination of the rough hairs on the sides of the body. From the outer margin of the fore-arm, near the foot, arise several long, stiff, straggling bristles.

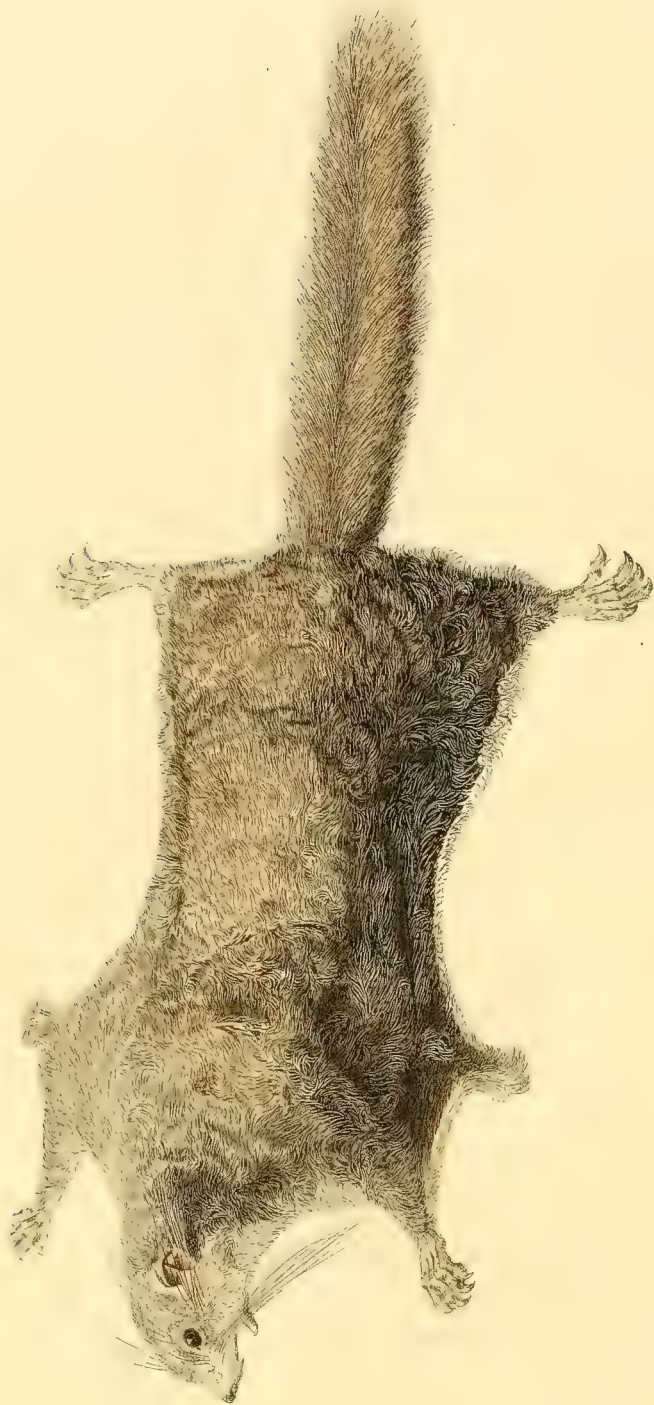
The general enumeration of Indian Sciuri, which was given in the VIIth Number of these Researches, concludes with several species, which, by their size, exceed all the Squirrels that have as yet been discovered in other parts of the world. They have received the names of *Sciurus bicolor*, *Sciurus Leschenaultii*, *Sciurus Hypoleucos*, *Sciurus Macrourus*, and *Sciurus maximus*; and while several of these appear to be mere varieties, the distinction of the others may be considered as confirmed by later investigations. I shall not at present add any remarks to those formerly given, on the probable identity of the *Sciurus Macrourus* and the *Sciurus maximus*; but I shall detail the result of my observations on the *Sciurus Leschenaultii* and the *Sciurus Hypoleucos*. The examinations which I have again instituted, and a more rigorous comparison of the numerous specimens from Java, contained in the Honourable East India Company's Museum, together with the specimens from Siam, and the descriptions of Hamilton and Sparrmann; with the opinion of my much esteemed friend M. Temminck, have inclined me to consider the *Sciurus Hypoleucos*, of the VIIth Number of this Work, a mere variety of the *Sciurus Leschenaultii*; and I take, therefore, this early opportunity to detail the result of my later investigations. The varieties of the *Sciurus Leschenaultii* and of the *Sciurus bicolor* are, in many instances, so strongly marked, that they appear to be distinct species, until the gradual passage of one to the other becomes apparent, by the examination of a large series of specimens. The name of *albiceps* was first given to the former of these species; but M. Desmarest observing that it could not be applied with propriety to all the varieties contained in the Museum at Paris,

SCIURUS BICOLOR.

introduced the name of *Leschenaultii*. One variety, in the Honourable Company's Museum, has the upper parts of a testaceous colour, and the under parts almost pure white: this suggested the name of *Hypoleucos*; but it now remains as a variety of the *Sciurus Leschenaultii*.

Of the large Indian Squirrels, which are the subject of these remarks, three species remain, which appear to have clear distinguishing characters:—the *Sciurus bicolor*, the *Sciurus Leschenaultii*, and the *Sciurus maximus*. They have all a dark colour above, varying from brown of various shades to black, a pale tint underneath, and a large obtuse nail on the thumb of the anterior extremities; but the *Sciurus maximus* has distinguishing characters, in a reddish brown tint above, in a very large tuft of hairs arising from the ears, in several coloured bands on the cheeks, and in a tail more full and bushy than in the other species. The *Sciurus Leschenaultii* is distinguished by a more uniform colour above, inclining to chestnut, a nearly white under side, and a grayish tint on the nose and anterior part of the head. The most common dress of the *Sciurus bicolor* is black above, and yellow underneath; in this it is easily distinguished from the two other species. The subject described in this article constitutes a strongly marked variety, which in various points resembles the *Sciurus Leschenaultii*, but is sufficiently distinguished by its brilliant yellow under parts.

The manners of the *Sciurus bicolor* present nothing peculiar. It is by no means scarce in many parts of Java, but it is far less prolific than the *Sciurus Plantani*. It rarely approaches the villages and plantations, and the cocoa-nut trees suffer but little from its depredations. It retires into the deepest forests, where its food is abundantly supplied by wild fruits of various kinds. I observed it first in the most eastern districts of the Island, in Lamajang, Pugar, and Blambangan, and subsequently in my travels through the Native Prince's territory from Banyumas to Kediri. But in all these tracts I never found the *Sciurus bicolor*, as described by Sparrmann and Hamilton. The natives keep the animal in a domestic state in their dwellings, and also eat its flesh occasionally.



6 Inches.

PTEROMYS GENIBARRBIS.

Engraved by W. Taylor

Drawn by W. Donnell.

London, Published by Kingsbury, Parbury & Allen, Leadenhall Street, June 1852

PTEROMYS GENIBARBIS.



ORD. IV^{me} RONGEURS, *Cuvier*. 1^{re} Division.

ORD. IV. GLIRES, *Linn.* Syst.

ORD. IV. PRENSICULANTIA, *Illiger*. Fam. 9, Agilia.

PTEROMYS, *Cuv. Geoffr. Illig.*

SCIURUS, *Linn. Briss. Schreb. Pallas, &c.*

PETAURUS, *Fischer*.

CHAR. GEN.—*Dentium formula; Primores* $\frac{2}{2}$, *Molares* $\frac{5-5}{4-4}$. *Primores superiores* pagina antica lævigati, inferiores compressi. Pro *Laniariis* diastema. *Molares* abrupti obducti tritores, supra antico accessorio.

Rostrum obtusiusculum. *Labrum* fissum. *Sacculi buccales* nulli. *Auriculæ* rotundatæ.

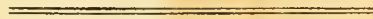
Cauda elongata. *Mammæ* apertæ, pectorales et ventrales.

Pedes dermopteri: patagium lumbare sæpius in angulum anteriorem dilatatum osse fultum, interdum patagium collare adest. Antipedes digitis quatuor et verruca hallucari, scelides pentadactylæ. *Illiger*.



Pteromys canus, subtus albus, dorso medio fulvescente, cauda oblonga obtusa plana disticha, vibrissis genarum numerosis radiatis adpressis.

Kechubu, of the Javanese.



IN the systematic catalogues of Mammalia, two species of *Pteromys* have hitherto been enumerated, as natives of the Island of Java; the most remarkable of these, the *Sciurus Petaurista* of Gmelin, is found in various collections, and its characters are accurately defined: the *Sciurus Sagitta* of Linnæus is still imperfectly known. The collections of the Honourable East India Company contain two new species, which have been added from the same Island; one of these, the *Pteromys genibarbis*, has been selected for the present article. The history of the *Sciurus Petaurista* was first illustrated by the researches of Vosmaer and Pallas. The *Sciurus*

PTEROMYS GENIBARBIS.

Sagitta is mentioned as a native of Java, by Linnæus, in the 12th Edition of the *Systema Naturæ*, on the authority of Nordgren; and a detailed description of it is given after the specific character: I was not so fortunate as to procure it. By M. Cuvier it is enumerated as an inhabitant of the Eastern Archipelago, generally. Professor G. Fischer has arranged the *Sciurus Sagitta*, as a synonym of the *Petaurus Petaurista* (*Sciurus P.*): Pennant also has formed the opinion that they were the same animal, but Boddært admits its existence as a distinct species, and Pallas enumerates, with his usual precision, the characters which distinguish it from *Sciurus Petaurista*. From these various opinions among the most eminent naturalists, it appears that its history and description require further illustration.

To distinguish the *Sciurus Sagitta*, as far as it is yet known, at once, from the *Pteromys genibarbis*, it is sufficient to state, that it is described as having a ferruginous brown colour, that the flying-membrane extends from the head to the anterior extremities, and that it is only one palm in length. The appearance which is expressed by the specific name of *Sagitta*, is not observed in the *Pteromys genibarbis*; and several other distinctions will appear in the following description.

The specific name of our animal is derived from a numerous series of bristles or vibrissæ, disposed on the cheeks, in a radiated manner; and which, as far as I have been able to determine, distinguishes it from all other species. The *Pteromys genibarbis* has very nearly the size of the common European Squirrel: it measures full eight inches from the nose to the root of the tail. Its general appearance is that of the Flying-Squirrels of northern climates. The head is short, ovate, laterally compressed, and attenuated to a short, obtuse muzzle, which projects beyond the lower jaw. The nose is fleshy, thick, elevated, and the nostrils are pierced in part from the extremity, and in part from the sides. The emargination of the upper lip is scarcely perceptible, and the lower lip is short and regularly defined. The rictus, or gape of the mouth, is small; and the head passes gradually, and imperceptibly to the body, by a very short neck. A peculiar character is afforded to our animal, by the vibrissæ, or beard of long, stiff bristles on the sides of the head, which are disposed successively above the upper lip, on the cheeks, and on the extremity of the lobes of the ears. The vibrissæ of the first series are numerous, longer than the head, spreading, and of a dark colour: the second series, from the existence of which the specific name has been derived, covers the cheeks in a radiated manner, from the posterior canthus of the eye, towards the jaws; it consists of above twenty separate bristles, closely applied to the sides of the head, about an inch in length in the middle, and gradually decreasing at the upper and lower margin: the third series arises from the base of the posterior portion of the lobe of the ear; it

PTEROMYS GENIBARBIS.

constitutes a fascicle of long slender bristles, partially concealed by the second series, spreading far from the head, and exhibiting a character very different from the brush-like appendages which constitute the bearded or pencillike auricles, in several species of the genus *Sciurus* of Linnæus. A less perceptible tuft of long, delicate hair arises likewise from the anterior portion of the lobe of the ear.

The eyes have the usual character both of those of the genus *Pteromys* and of *Sciurus*; they are large and prominent. The structure of the ear of our animal presents several peculiarities, which distinguish it from the other Javanese species. The interior of this organ is large, naked, and disposed transversely near the extremity of the head; it is divided, in the middle, by a continuation of the concha, which separates an extensive meatus auditorius externus from the superior cavity. The lobe is short, linear-oblong, with an inflected margin, and surrounds only the superior portion of the ear; opposite to the continuation of the concha, it descends abruptly; and from the base of its inflected margin, arises a thick tuft of silky hair of a white colour. The naked interior portion is partially covered by the bristles of the cheeks; and the long hairs which arise from the anterior and posterior portions of the lobe, have already been described as affording a peculiar character to our animal.

The teeth agree, in number and disposition, precisely with those of the other species of *Pteromys*. The first grinder in the upper jaw is very minute, and closely applied to the second: the surfaces are generally uniform; and being calculated for trituration, present a few rounded tubercles. The crown of each, individually, has an oblong form: they are arranged transversely, but in contact with each other, so as to constitute an uniform, longitudinal, triturating ridge. The front teeth in the upper jaw have the character which is given in the generic description of those in the lower jaw; the base only is remaining in our specimen.

The proportion of the extremities to the body appears the same in all species of *Pteromys*; but in the flying-membrane, a slight peculiarity is observed in this, and in other Javanese species: the length of the cartilage which supports it anteriorly, affords the capacity of forming a more complete expansion than in other species. M. Cuvier observes, that both in the *Pteromys Petaurista*, and the *Pt. Sagitta*, the membrane forms a very acute, salient angle behind the wrist: in the former, and in a new species, above mentioned, the degree of expansion which this arrangement affords, appears very evident: the attitude in which the *Pteromys genibarbis* was placed, in the Museum, and which has been carefully preserved in the figure by the artist, does not exhibit the membrane completely expanded.

PTEROMYS GENIBARBIS.

Between the anterior extremities and the head, no vestige of a flying-membrane appears; in the *Sciurus Sagitta*, on the contrary, as described by Linnæus, the membrane is extended from the head to the wrists. In its expansion, between the extremities, the membrane is bordered by a beautiful fringe, consisting of delicate hairs, of a lighter colour than the fur of the animal generally, very closely arranged, and diverging in a horizontal or slightly curved direction. This border is more full and compact along the posterior extremities. At the termination of the cartilaginous support near the wrist, it constitutes a delicate broad brush or penicillus. The feet, as in other species of *Pteromys*, project beyond the membrane; the fore-feet consist of four toes, and a very obscure rudiment of a thumb. The toes are slender, compressed, and armed with broad, strongly curved, and very sharp claws. The two middle toes are somewhat longer than the exterior, which are nearly of equal length. An elevated, circular, warty protuberance exists on the extremity of the first phalanx, above the articulation. On the posterior extremities, the feet are divided into five toes, which are somewhat lengthened, but in other respects agree in character with those on the anterior extremities. They admit of free motion; the small toe is nearly as long as the intermediate toes; the thumb is smaller, and somewhat removed from the other toes. The warty protuberance on the extremity of the first phalanx, is most conspicuous on the small toe.

The tail equals in length nearly two-thirds of the body of our animal. It is compressed, oblong, somewhat broader in the middle, and truncated at the extremity. The separate hairs which cover it, are arranged loosely, in a distichous manner, or spreading from the middle to the sides; they are long, delicate, silky, slightly undulated, and numerous, affording to this organ a degree of fulness, which is highly ornamental.

The general covering of our animal is very beautiful. The fur consists of long hairs, downy at the base, closely arranged on the neck and back, more distant on the flying-membrane. For an animal inhabiting a hot climate, this fur is uncommonly thick; it possesses indeed the delicacy and fulness of the fur of an animal from the northern regions. Solitary bristly hairs project in many parts from the downy covering. On the under parts the texture of the hair generally is more lax and delicate; it is woolly on the throat, breast, and abdomen; on the hypochondriæ, and on the flying-membrane, it is loose and straggling.

The general colour of the fur of our animal is gray on the upper parts, and white underneath; the head, above, is purely gray; on the neck, the back, and the tail this colour has a brownish tint, inclining to tawny; the anterior and middle

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parts of the membrane are sooty-brown, diversified with grayish hairs, scattered singly, or in tufts; on the thick lanuginous covering of the posterior extremities, the colour is lighter; on the extreme border it is gray. The hairs are whitish, closely arranged, and delicate along the cartilage by which the membrane is expanded; at the extremity they form a close fringe, which is continued along the entire lateral border of the membrane. On the feet and toes, short, delicate, grayish hairs are scattered, not very closely. A greatly enlarged scrotum is a common character of the different species of *Pteromys*; in our animal, this part is covered with a soft, white down. On the lateral parts of the head, between the ears and the termination of the neck, the hairs are dispersed in small tufts, alternately of darker and lighter shades; and the separation between the upper and the lower parts is strongly marked along the neck and shoulder.

DIMENSIONS.

	Inches	Lines
Length of the body and head, from the extremity of the nose		
to the root of the tail	8	9
..... the tail	5	0
..... head and neck	3	0
..... anterior extremities, from the shoulder to the extremity		
of the claws	3	0
..... cartilage supporting the flying-membrane	1	4
..... posterior extremities	3	9

The *Pteromys genibarbis* presents nothing peculiar in a generic point of view. The javanese species, generally, are distinguished by the length of the cartilage which supports the flying-membrane: in two of our species, the tail is compressed, as in the *Pteromys hudsonius*; in the *Pt. Petaurista*, though it is greatly elongated, this organ is cylindrical, as in the common European Flying Squirrels.

The *Pteromys genibarbis* is very rarely met with in Java: I obtained a single individual only, near the Eastern extremity of the Island, in the same districts which also furnished the *Delundung* and the *Tupaia* to my collection. The most assiduous research in the central districts did not procure me another individual. I have reason to believe that the *Sciurus Sagitta* of Linnæus, which was probably obtained near the Western extremity of Java, is equally rare. The description of the latter, contained in the 12th Edition of the *Systema Naturæ* of Linnæus, on the authority of Nordgren, has the character of being carefully made on the spot; the size, the colour, and particularly the continuation of the membrane from the sides of the head to the anterior extremities, shew it to be an animal clearly distinct from

PTEROMYS GENIBARBIS.

the *Pteromys genibarb*is. It is equally different from another Javanese species of this genus, the description of which will be given in one of the future Numbers of these Researches.

The *Pteromys genibarb*is inhabits the forests of Pugar, one of the most sequestered districts of the Eastern portion of Java. Like other species of this genus, it lives on fruits: it was caught by the natives, who had been employed in the pursuit of the *Pteromys Petaurista*, to the retreats of which they are directed by a shrill sound, which it emits in the night. Our animal appears to agree with this species in its nocturnal habits, as well as in its mode of life and manners.



PTEROMYS LEPIDUS.

Engraved by W. Taylor.

Drawn by W. Daniell.

PTEROMYS LEPIDUS.



ORD. IV^{me} RONGEURS, *Cuvier*. 1^{re} Division.

ORD. IV. GLIRES, *Linn. Syst.*

ORD. IV. PRENSICULANTIA, *Illiger*. Fam. 9, Agilia.

PTEROMYS, *Cuv. Geoffr. Illig.*

SCIURUS, *Linn. Briss. Schreb. Pallas, &c.*

PETAURISTUS, *G. Fischer, Zoognosia, Vol. III. p. 498.*

CHAR. GEN.—*Dentium formula*; *Primores* $\frac{2}{2}$, *Molares* $\frac{5-5}{4-4}$. *Primores* superiores pagina antica lævigati, inferiores compressi. Pro *Laniariis* diastema. *Molares* abrupti obducti tritores, supra antico accessorio.

Rostrum obtusiusculum. *Labrum* fissum. *Sacculi buccales* nulli. *Auriculæ* rotundatæ. *Cauda* elongata. *Mammæ* apertæ, pectorales et ventrales.

Pedes dermopteri: patagium lumbare sæpius in angulum anteriorem dilatatum osse fultum, interdum patagium collare adest. Antipedes digitis quatuor et verruca hallucari, scelides pentadactylæ. *Illiger*.



Pteromys nigricante-fuscus, subtus albus, capite dorsoque medio canescentibus, cauda corpore longiore oblonga plana disticha, auriculis oblongis simplicibus nudis, vibrissis aggregatis longissimis.



IN the description of the *Pteromys genibarbis*, contained in the Fourth Number of these Researches, the peculiarities of the *Sciurus sagitta*, as they are given in the 12th Edition of the *Systema Naturæ* from Nordgren, are concisely enumerated. A ferruginous tint mixed with the brown of the upper parts, a membrane extending from the head to the anterior extremities, and a size not exceeding a palm in length, distinguish that animal both from the *Pteromys genibarbis* and from the *Pteromys lepidus*, which is now to be considered.

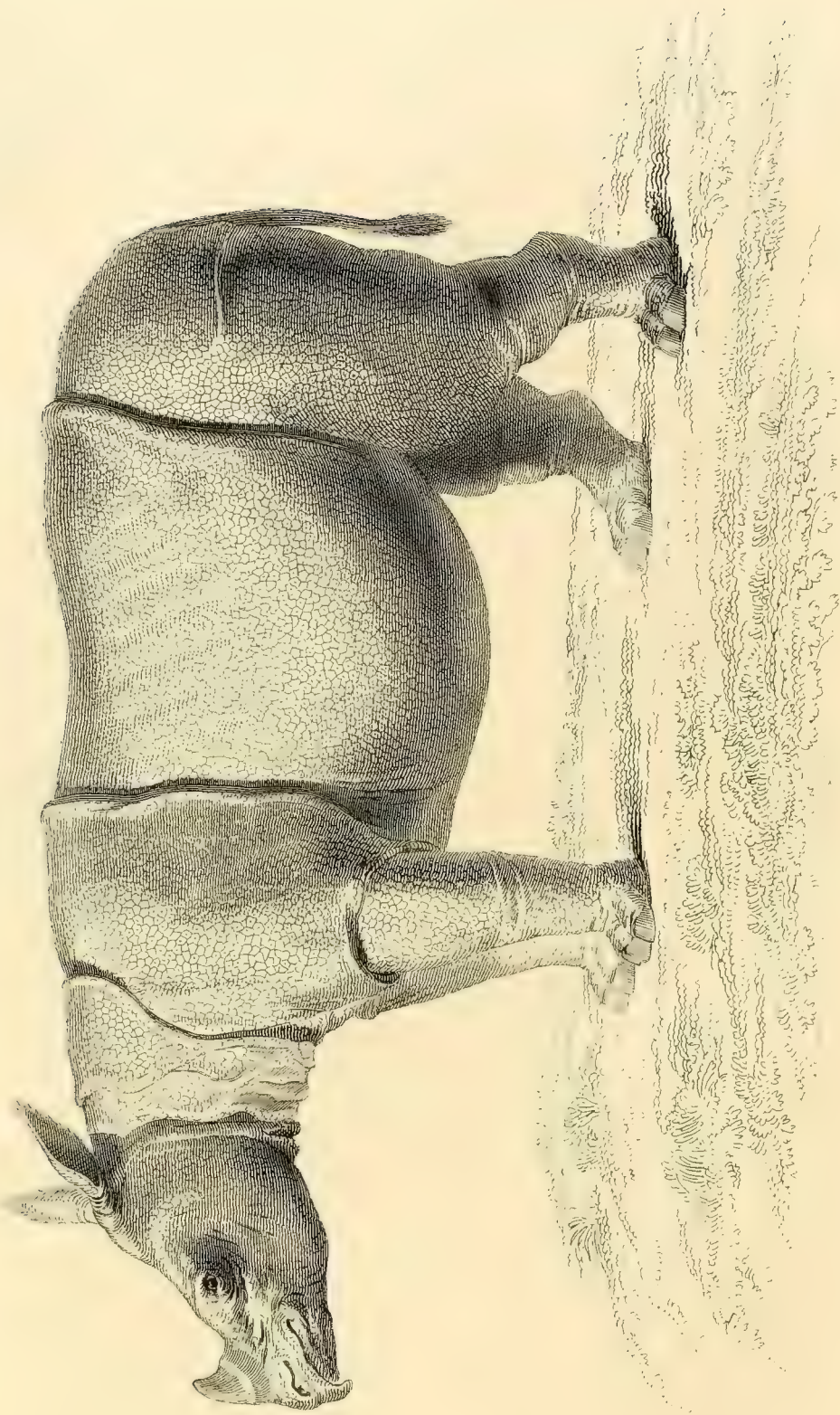
The characters which principally distinguish the *Pteromys genibarbis* from our animal, are a large series of bristles, which covers the cheeks in a radiated manner; a

PTEROMYS LEPIDUS.

tuft of long hairs to the extremity of the ears; a tail slightly extended in breadth in the middle, a tawny tint generally diffused over the upper parts, and a greater size.

The entire length of the *Pteromys genibarbis* is thirteen inches and three fourths; that of the *Pteromys lepidus* is seven inches and three fourths. The flying membrane is similar in both, and admits of great expansion. The colour of *Pteromys lepidus* above is dark brown inclining to black: the head, neck, and back are mixed with gray, which colour shews itself in very delicate tufts. The base of the tail, and the extremity of the body, are more uniformly grayish: towards the end of the tail, the brown colour is less intense, and inclines slightly to tawny. The extremities have above a lighter brownish-gray tint. Underneath, the general colour is white, with a delicate yellowish hue; this passes imperceptibly to brown towards the border of the membrane and towards the thighs. The tail beyond the base has the same tint as the outer parts of the membrane. This is surrounded by a whitish border of delicate fur, and the thighs have exteriorly a beautiful fringe of long hairs. The extremities underneath, the cartilage by which the membrane is expanded, and the teeth are yellowish. The ears are large, oblong, and extend far from the head; the tip is naked, the covering of the base is extremely minute and delicate. The bristles are longer than the head, very thick at the base, arising near each other from one point between the lip and the eyes, and have a straight lateral direction. The tail is longer than the body, oblong, and rounded at the extremity; the hairs that compose it are silky, of uniform length, and spread with perfect regularity to each side, forming a well-defined distichous tail: the base is somewhat contracted. The head is thick, and the muzzle proportionally short. The feet and toes agree in character with those of *Pteromys genibarbis*.

The *Pteromys lepidus* is a nocturnal animal, and in its manners and food resembles the other species of this genus. It is only found in the closest forests of Java, where the height of the trees and the luxuriance of the foliage effectually conceal it. It is with great difficulty pursued or seized. On the Plate it is represented of natural size.



RHINOCEROS SONDAICUS.

RHINOCEROS SONDAICUS.

ORD. VI^{me} PACHYDERMES, *Cuvier*. 2^{de} Famille. Pachydermes ordinaires,
2^{de} Division.

ORD. II. BRUTA, *Linn.* Syst.

ORD. V. MULTUNGULA, *Illiger*. Fam. 18, Nasicornia.

RHINOCEROS, *Linn. Briss. Erxleb. Bodd. Cuv. Geoff. Illig.*

CHAR. GEN.—*Dentes primores* his nulli, illis supra duo minuti decidui, infra duo minuti conici inter duo majores cylindricos, omnes inclusi. Pro *Laniariis* diastema. *Molares* complicati tuberculati, supra infraque utrinsecus septem.

Rostrum productum chilomate obtuso; labro in processum mobilem excurrente.

Cornu unicum aut duo cornea solida acuta, naso imposita. *Auriculæ* oblongæ, capite multo breviores, basi infundibuliformes.

Corpus setis raris obsitum. *Cauda* brevis. *Mammæ* apertæ duæ ventrales.

Pedes distincti ambulatorii, tridactyli, digitis cute obvolutis. *Ungues* : ungulæ tres insistentes, omnes anticæ. *Illiger*.

Rhinoceros cornu unico, rugis colli obsoletis, scutulis epidermidis margine angulatis medio concavis setis paucis brevibus obsitis, auribus margine caudaque subtus pilosis.

Warak of the Javanese.

Badak of the Malays, and of the inhabitants of the western parts of Java.

Rhinoceros sondaicus, *Cuvier*, in *Encycl. Method. Mammalog.* p. 399, par M. A. G. Desmarest, 1822.

THE Rhinoceros sondaicus has so great a resemblance in its general physiognomy, to the Indian Rhinoceros, hitherto known by the name of One-horned Rhinoceros, that it requires considerable accuracy and care to demonstrate its distinguishing characters. Having had an opportunity, during my residence at Surakarta, the capital of the dominions of the Emperor of Java, to examine an individual, taken during infancy, and kept in confinement, or rather in a state of

RHINOCEROS SONDAICUS.

domestication, I propose here to detail concisely the peculiarities on which the specific distinction is founded, and to add some general remarks on the manners and distribution of this species through the Island.

The separation of this, from the common Indian species, the *Rhinoceros unicornis* of Linné, and the *Rhinoceros indicus* of the *Régne animal*, was proposed by the Baron Cuvier, who applied to it the name of *Rhinoceros sondaicus*. I am acquainted with his account and definition of this species, only by the summary notice published by M. Desmarest in the *Encyclopedia*; and this has served for my comparison. But the decision of M. Cuvier on this subject must be considered conclusive. To ascertain and establish the characters of a new species, he was prepared, not only by his unparalleled knowledge as a Zoologist, but also by his previous labours and researches concerning the common Indian, or One-horned Rhinoceros. We owe to him the most complete account that has yet been made public of this species; it is contained in the *Ménagerie du Mus. d'Hist. Nat.*, and illustrated by a beautiful and accurate engraving. The materials I have collected to enable me to contribute to the illustration of this species, consist in some remarks made at Surakarta, in 1817, and in a drawing, prepared under my inspection, by an artist, who, although educated in Java, had acquired considerable proficiency. On the Plate annexed to this article, a careful representation is given of this drawing, which, though deficient in some points that the skilful pencil of Mr. Daniell would have supplied from the living animal, exhibits, with scrupulous accuracy, the form and proportions of our animal. This individual was, by measurement taken in 1817, nine feet long, and four feet three inches high at the rump. The Rhinoceros figured by M. Fred. Cuvier, in the 13th Livraison of the *Hist. Nat. des Mammifères*, brought to Europe from the British possessions in India, was higher in proportion to its length, and its form was more unwieldy. The entire length was seven feet, and its height four feet and ten inches. The individual described by M. Georges Cuvier, in the *Menag. du Mus. &c.* had, according to the dimensions given, a more lengthened form; but the figure exhibits an animal, in comparison with the *Rhinoceros sondaicus*, of greater bulk, and more gross dimensions. The head of our animal is strongly attenuated to the muzzle, and has a triangular form; the flexible upper lip is considerably lengthened, and the sides of the head are marked with protuberances, or scutula, resembling those on the body, but no great roughnesses or folds are apparent. The characters therefore, given by M. Cuvier, as far as regard the form of the body and of the head, are confirmed by the drawing, and by the measures taken from life. The marks of distinction afforded by the folds of the external covering, are less evident than those afforded by the form of the body and the attenuated head. The following modifications may,

RHINOCEROS SONDAICUS.

however, be noticed:—The folds, on the whole, appear less rough or prominent than in the Indian Rhinoceros; those of the neck are comparatively smaller; and the posterior fold, which has an oblique direction towards the spine, is less extended. The thick covering, or coat, of our animal is divided on the surface into small tubercles, or polygonous scutula; and a few short bristly hairs, rising from a slight depression in the centre, constitute a peculiar character. The ears are bordered with a series of long stiff bristles, closely arranged; and a similar series of bristles also extends along the tail, underneath, through its whole length.

The distinguishing characters of our animal now detailed, are, a lengthened form of body; legs proportionally elevated; head acuminate; scutula many-sided, with a central depression, giving rise to one or to several short bristles, and a series of long hairs at the extremity of the ears, and under the tail: this is likewise the substance of the description of the *Rhinoceros sondaicus*, given by M. Desmarest, in the *Encyclopedia*.

The individual which is represented in our Plate, and which has afforded the preceding details, was taken, while very young, in the forests of the Province of Keddu, and was conveyed to the Residency at Magellan, in the year 1815 or 1816. By kind treatment it soon became domesticated to such a degree, that it permitted itself to be carried in a large vehicle resembling a cart, to the capital of Surakarta. I saw it during its conveyance, and found it perfectly mild and tractable. At Surakarta it was confined in the large area or square which bounds the entrance to the royal residence. A deep ditch about three feet wide limited its range, and for several years it never attempted to pass it. It was perfectly reconciled to its confinement, and never exhibited any symptoms of uneasiness or rage, although, on its first arrival, harassed in various ways, by a large proportion of the inhabitants of a populous capital, whose curiosity induced them to inspect the stranger of the forest. Branches of trees, shrubs, and various twining plants were abundantly provided for its food; of these the species of *Cissus*, and the small twigs of a native fig-tree were preferred. But plantains were the most favourite food, and the abundant manner in which it was supplied with these, by the numerous visitors, tended greatly to make the animal mild and sociable. It allowed itself to be handled and examined freely, and the more daring of the visitors sometimes mounted on its back. It required copious supplies of water; and when not taking food, or intentionally roused by the natives, it generally placed itself in the large excavations, which its movements soon caused in the soft earth that covered the allotted space. The animal rapidly increased in size: in the year 1817, having been confined at Surakarta about nine or ten months, the dimensions as

RHINOCEROS SONDAICUS.

already stated, were nine feet in length, and four feet three inches in height at the rump. In 1821, it had acquired the height of five feet seven inches. This information I received from my friend Mr. Stavers, who is now in England, on a visit from the interior of Java; and he favoured me further with the following details, which complete the history of the individual, whose figure is annexed to this article. Having considerably increased in size, the ditch of three feet in breadth was insufficient for confining it; but leaving the inclosure, it frequently passed to the dwellings of the natives, destroying the plantations of fruit-trees and culinary vegetables, which always surround them. It likewise terrified those natives that accidentally met with it, and who were unacquainted with its appearance and habits. But it shewed no ill-natured disposition, and readily allowed itself to be driven back to the inclosure, like a Buffalo. The excessive excavations which it made by continually wallowing in the mire, and the accumulation of putrefying vegetable matter, in process of time became offensive at the entrance of the Palace, and its removal was ordered by the Emperor, to a small village near the confines of the capital, where, in the year 1821, it was accidentally drowned in a rivulet.

The Rhinoceros livès gregarious in many parts of Java. It is not limited to a particular region or climate, but its range extends from the level of the ocean to the summit of mountains of considerable elevation. I noticed it at Tangung, near the confines of the Southern Ocean, in the districts of the native Princes, and on the summit of the high peaks of the Priangan Regencies; but it prefers high situations. It is not generally distributed, but is tolerably numerous in circumscribed spots, distant from the dwellings of man, and covered with a profuse vegetation. On the whole, it is more abundant in the western than in the eastern districts of the Island. Its retreats are discovered by deeply excavated passages, which it forms along the declivities of mountains and hills. I found these occasionally of great depth and extent.

In its manners, the Rhinoceros of Java is comparatively mild. It is not unfrequently met in the wilds by Europeans and by natives. No instance of its shewing a disposition to make an attack has come to my knowledge; being the largest animal in Java, its passions are not roused, as in many parts of India, by contentions with the Elephant. It is rarely seen in a domestic state, but it is occasionally decoyed into pits, and destroyed. Our animal rambles chiefly at night, and often occasions serious injury to the plantations of coffee and pepper, which are laid out in the fertile districts selected for its retreats.

The horns and skin are employed for medicinal purposes by the natives.



Drawn & Engraved by W. Daniell.

TAPIRUS MALAYANUS.

TAPIRUS MALAYANUS.

ORD. VI^{me} PACHYDERMES, *Cuvier*. 2^{de} Famille. Pachydermes ordinaires,
2^{de} Division.

ORD. VI. BELLUÆ, *Linn.* Syst.

ORD. V. MULTUNGULA, *Illiger*. Fam. 20, Nasuta.

TAPIRUS, *Cuv. Briss. Schreb. Fischer, Illiger, &c.*

HYDROCHOERUS *Erxleb.*

CHAR. GEN. *Dentium formula*: *Primores* $\frac{6}{6}$, *Laniarii* $\frac{1}{1}$, *Molares* $\frac{7-7}{6-6}$. *Primores* inclusi, utrinque 6, contigui, subobliqui, supra quatuor intermedii incisorii, lateralis utrinque major, laniarium mentiens, infra quatuor intermedii superioribus æquales, lateralis utrinque minor. *Laniarii* inclusi, supra a primoribus remoti, minimi; infra illis contigui, mediocres, primoribus superioribus exterioribus longitudine æquales. *Molares* supra utrinsecus 7 infra 6, complicati, coronide collinis rectiliniis duobus transversis.

Rostrum acutum. *Nasus* elongatus mobilis. *Auriculæ* oblongæ.

Corpus pilis appressis rariusculis tectum. *Cauda* brevissima. *Mammæ*.....

Pedes antici tetradactyli digito externo brevior et minor, postici tridactyli. *Ungues*: ungulæ omnes insistentes anticæ.

Tapirus ejubatus niger, tergo lateribus abdominis uropygio auriumque apicibus albis.
Tapirus Malayanus, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra. Trans.*
Linn. Soc. XIII. p. 2.
Le Maïba, *Fred. Cuv. Mamm. lithogr.*

DESCRIPTION.—“ The Malay Tapir resembles in form the American, and
“ has a similar flexible proboscis, which is six or eight inches in length. Its general
“ appearance is heavy and massive, somewhat resembling the hog. The eyes are
“ small. The ears roundish, and bordered with white. The skin is thick and firm,
“ thinly covered with short hair. There is no mane on the neck as in the American
“ species. The tail is very short, and almost destitute of hair. The legs are short,
“ and stout; the fore feet furnished with four toes, the hind feet with three. In the
“ upper jaw there are seven molars on each side, one small canine inserted exactly
“ on the suture of the incisor bone, and in front six incisors, the two outer of
“ which are elongated into tusks. In the under jaw there are but six molars; the
“ canines are large; and the number of the incisors, the outer of which are the

TAPIRUS MALAYANUS.

“smallest, is the same as in the upper jaw.” (From the third in the upper, and the second in the lower jaw, the molars have individually two elevated transverse ridges, which are received into the corresponding grooves of the opposite sides; but the first and second in the upper, and the first in the lower jaw, have a longitudinal ridge, which, when the mouth is shut, passes the ridge on the opposite tooth obliquely.) “The general colour is glossy black, with the exception of the back, “rump, and sides of the belly, which are white, and separated by a defined line “from those parts that are black.”

The preceding description is extracted from a Descriptive Catalogue of a Zoological Collection, made in the Island of Sumatra, by Sir Thomas Stamford Raffles, Lieut.-Governor of Fort Marlborough, and contained in the Thirteenth Volume of the Transactions of the Linnean Society, published in May, 1821. This contains the substance of the original description by Major Farquhar, and communicated by him to the Asiatic Society in 1816. The following account of a very young Tapir which Major Farquhar had alive in his house, forms part of a subsequent communication to the Asiatic Society. “It appears that until the age of four “months it is black, and beautifully marked with spots and stripes of a fawn colour “above, and white below. After that period it began to change colour, the spots “disappeared, and, at the age of six months, it had become of the usual colour of “the adult.” Major Farquhar says that he found this animal of a very mild and gentle disposition; that it became as tame and familiar as a dog; fed indiscriminately on all kinds of vegetables, and was very fond of attending at table, to receive bread, cakes, or the like. “The living specimen,” Sir Stamford Raffles adds, “sent from “Bencoolen to Bengal, was young, and became very tractable. It was allowed to roam “occasionally in the Park at Barrackpore, and the man who had charge of it, informed “me, that it frequently entered the ponds, and appeared to walk along the bottom “under water, and not to make any attempt to swim. The flesh is eaten by the “natives of Sumatra. It is known by different names in different parts of the country. “By the people of Limun it is called *Saladang*; by those of the interior of Manna, “*Gindol*; in the interior of Bencoolen, *Babi Alu*; and at Malacca, *Tennu*.”

The following are the exact dimensions of two Malay Tapirs; one a male, described by Major Farquhar; the other a female, killed at Bencoolen.

	MALE.		FEMALE.	
	Feet.	Inches.	Feet.	Inches.
Extreme length from the nose to the tail, measured				
along the back	6	10½	8	1
Circumference of the body	6	0	6	3
Height of the shoulder	3	2	3	5
Ditto of the haunch	3	4	3	9

TAPIRUS MALAYANUS.

To these extracts from the accounts of Major Farquhar and of Sir T. S. Raffles, which comprise all the information that has hitherto been communicated from Sumatra relating to the Malayan Tapir, I have only to add an account of the discovery of this interesting animal.

The first intelligence of its existence in Sumatra was given to the Government of Fort Marlborough at Bencoolen, in the year 1772, by Mr. Whalfeldt, who was employed in making a survey of the coast. In the month of April of that year, it is noticed in the records, that Mr. W. laid before the Government his observations on the places southward of Cawoor, where he met with the Tapir at the mouth of one of the rivers. He considered it to be the Hippopotamus, and described it by that name; but the drawing which accompanied the report, identifies his animal with the Tapir. This mistake in the name may readily be explained, when it is recollected that in the Tenth Edition of the *Systema Naturæ* of Linnæus, the Tapir is placed as a species of Hippopotamus, while in the Twelfth Edition no mention is made of that animal.

The learned Author of the *History of Sumatra*, William Marsden, Esq. was at this time Secretary to the Government at Bencoolen; and the Public owes to his zeal in collecting every valuable information relating to that Island, the first notice of the existence of this animal, which is by the Malays in many places denominated *Kuda-ayer*, literally Hippo-potamus. After the first discovery in 1772, the Tapir was not observed for a considerable period. From the same Catalogue of Sir T. S. Raffles, which has furnished the preceding description, it appears that in the year 1805, a living specimen was sent to Sir George Leith, when Lieutenant-Governor of Penang. It was afterwards observed by Major Farquhar in the vicinity of Malacca. A drawing and description of it were communicated by him to the Asiatic Society in 1816, and a living subject was afterwards sent to the Managerie at Barrackpore from Bencoolen. At this place a drawing was made by Mr. Diard in the year 1818, which, accompanied by an extract from the description of Major Farquhar, was communicated to his friends in Paris, where, in March, 1819, M. Fred. Cuvier published it in his large Lithographic Work on the Mammalia of the Menagerie in Paris.

In the month of September, 1820, the first specimen of the Malayan Tapir was received in England from Sir Thomas Stamford Raffles, with the general Zoological Collection of Mammalia and Birds, the descriptive catalogue of which being contained in the Thirteenth Volume of the Transactions of the Linnean Society, has been already referred to. This specimen of the Tapir was accompanied by a

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complete skeleton, and the thoracic and abdominal viscera preserved in spirits of wine; and in giving this concise narrative, I am happy to state that Sir Everard Home has been enabled by these materials to illustrate the resemblance between the Sumatran and American species, in a manner highly instructive and interesting both to the Zoologist and the comparative Anatomist, in a paper read before the Royal Society, in the month of April of the present year, and which will appear in the volume of the Society's Transactions now in the press.

The specimen deposited in the Museum of the Honourable East India Company, agrees in length and circumference of the body with the female, of which the dimensions are given by Sir Stamford Raffles; it measures a few inches less in height at the shoulder and at the haunch. It is in a perfect state of preservation. In the Plate which illustrates this article, it is very faithfully represented by the pencil of Mr. William Daniell; and a desire to communicate to the Public, without delay, an accurate figure of this interesting animal, will, I hope, be accepted as an apology for introducing it into the first number of this Work.



CERVUS MUNTJAK.

Drawn by W. P. Mead

CERVUS MUNTJAK.



ORD. VII^{me} RUMINANS, *Cuvier*.

ORD. V. PECORA, *Linn.* Syst.

ORD. VII. BISULCA, *Illiger*. Fam. 25, Capreoli.

CERVUS, *Linn. Briss. Erxleb. Schreb. Bodd. Cuv. Illig.*

CHAR. GEN.—*Dentes primores* supra nulli, infra octo incisorii. *Laniarii* plerumque nulli, paucis (Tarando, Elapho) superiores parvi solitarii inclusi: (uno hucusque cognito (C. Muntjak) exserti longissimi. *Horsf.*) *Diastema* inter primores et molares. *Molares* abrupti contigui obversi complicati tritores, utrinque seni.

Rostrum productum aut chilomate aut rhinario instructum. *Sinus* lacrymales.

Cerata frontalia decidua ossea plerumque ramosa, feminis sæpius nulla. *Auriculæ* mediocres acuminatæ.

Cauda brevissima. *Mammæ* apertæ quatuor inguinales.

Pedes distincti ambulatorii bisulci, digitis duobus insistentibus, duobus sæpius amotis parvis. *Ungues*: ungulæ duæ insistentes, et plerumque duæ succenturiatæ. *Illiger*.



Cervus cornibus caule elongato insidentibus basi bipartitis ramo altero elongato subcontorto apice uncinato altero brevi acuto, laniariis exsertis longissimis, sinibus lacrymalibus maximis, facie rugosa sulcata.

Muntjak, in the language of the Sunda Javanese, spoken in the western parts of the Island in the mountainous districts from Cheribon to Bantam.

Kidang, in the Javanese language properly so called, employed in all the districts east of Cheribon.

Kĳang, in the Malayan language and in Sumatra. *Marsden's Hist. of Sumatra*, 1783, p. 94: and *Third Edition*, 1811, p. 117, with a figure.

Rib-faced Deer, *Pennant's Hist. of Quadr. Second Edition*, 1781, p. 107, n. 50.

Chevreuil des Indes, *Allamand, Edition d'Hist. Nat. de Buffon. Amsterdam*, c.c. 1780. *Buff. Supp. tome 6, pl. XXVI. Cuv. Règne anim, p. 257.*

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Cervus Muntjak, der MUNTJAK, *Zimmerman Geographische Geschichte des Menschen und der vierfüssigen Thiere*, II. Band, p. 131. Leipzig, 1780. (From the communication of Pennant.)

Cervus Muntjak, *Boddaert Elen. anim.* I. p. 136, Rotterdam, 1785.

Cervus vaginalis, *id.* *id.*

Cervus Muntjac, *Schreb. Säugthiere. Tab.* 254. *Syst. Linn. Ed. Gmel.* I. p. 180.

Fischer Zoognos. III. p. 458. *Shaw's Gen. Zool. Vol. II. Part II.* p. 301.

Cervus Moschatus, *Blainv. nouv. Bull. de la Soc. Phil.* 1816, p. 77.

Cervus subcornutus, *id.* *id.* *Encycl. Method. Mammalog.*

Par. M. A. G. Desmarest, 1822. p. 442.

Cervus Muntjak? *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra, Tr. Linn. Soc. XIII.* p. 265.

Cervus Muntjac, *Desm. Encycl. l. cit.* p. 441.

Cervus Moschus, *id.* *id.*

ALTHOUGH a very common animal in the Islands of the Indian Archipelago, the CERVUS MUNTJAK or KIDANG has only in very recent periods been distinctly known in Europe. The first clear account of our animal, as it occurs in Java, was communicated to the Public by Mr. Pennant, in the Second Edition of his History of Quadrupeds, which was published in 1781; and the learned author of the History of Sumatra, soon after this period, mentioned it with the name of KĪJANG, by which it is distinguished in that Island. The name of *Cervus Muntjak* was first employed by Zimmerman, in the German Edition of his Geographical Zoology. Schreber published a copy of Allamand's figure of this animal, as it occurs in Bengal, with an incorrect modification of the native name, which had been communicated to Zimmerman by Pennant. Since this period we find this name generally adopted by systematic writers, as appears by the preceding references. Mr. Allamand had an opportunity, in the year 1778, of examining an animal, brought in a living state to Amsterdam from Bengal, which had all the characters of the *Cervus Muntjak*. He gave a very excellent description of it, with the name of CHEVREUIL DES INDES, in the edition of Buffon's Natural History which he published in Holland; this was afterwards introduced, by the author himself, into the Sixth Volume of the Supplement of the Natural History of Quadrupeds and Birds, which appeared in 1782. The animal described by Allamand agrees in general character and in form with the

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Javanese Kidang, although it is sufficiently different in colour to constitute a variety. A detailed drawing of the head of the Rib-faced Deer from India, presented to the Honourable Company's Museum by Dr. Francis Hamilton, exhibits this peculiar character of the face; but the black lines which mark the forehead and the pedestals of the horns have a paler tint. Allamand illustrates his description with a good figure of the Indian Roe, which has been copied into several books on Natural History.

Boddaert has described the Rib-faced Deer of Pennant as a species distinct from the Chevreuil des Indes of Allamand: the former—*Cervus Muntjak*, *Bodd.*—is characterized, *cornibus trifariis uncinatis corpore crassiore facie sulcata*: the latter, which he names *Cervus vaginalis*, *cornibus uniramosis parvis vaginis duabus convexis pilosis, ad os nasi coeuntibus, implantatis, sinubus lacrymalibus maximis*. It will appear from the following details, that the horns, in the young Kidang, are undivided; that in the adult they are commonly bipartite and hooked (uncinate); that they are rarely trifid; that the ribs of the face appear more distinct in the prepared specimens than in the animal during life; and that the species is always supplied with very large lacrymal sinuses. I have therefore considered Boddaert's descriptions as applying to the same animal modified by age and circumstances. The specific character of Gmelin, founded on the description of Pennant, does not convey an accurate idea of our animal. I shall detail in the sequel my reasons for uniting in the table of Synonyms, the *Cervus moschatus* and the *Cervus subcornutus* of Dr. De Blainville, with the *Cervus Muntjak*.

As several perfect specimens of the Kidang, which were forwarded from Sumatra by Sir Stamford Raffles, are contained in the Museum at the India House, a faithful drawing was prepared by Mr. Daniell, which I shall endeavour to illustrate by the following description, adding some details regarding its history and peculiarities in Java.

The name of MUNTJAK, introduced by Zimmerman as the specific name, is applied to our animal, in the *Sunda* language, which is used in the western portion of the Island. In the *Javanese* language properly so called, which is employed in the eastern districts and at the Courts, the name is KIDANG, which with a slight modification—KIJANG—is also employed in the Malayan language, and in most parts of Sumatra.

The distinguishing characters of the *Cervus Muntjak* consist in elongated pedestals supporting the horns, in canine teeth lengthened so as to constitute tusks, and in several large folds of the skin of the forehead, which in the prepared specimens

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shew themselves in three distinct lines. These characters are represented with care and accuracy on the Plate of Illustrations which is added to this Number: one view exhibits, laterally, the naked skull, the other the anterior appearance of the head, covered with the integuments: the general outline of the skull agrees with that of the *Cervus Elaphus*, its peculiarities shew themselves in the following points. Near the upper extremity of the nasal bones, about three inches from the end of the muzzle, a rising commences on each side, forming a prominent ridge, rounded above, compressed and somewhat irregular at the sides, having nearly the dimensions of a small finger, and being continued on the outer margin of the skull, so as to constitute the base of the pedestal of the horns. A depression of the nasal bones, about three-fourths of an inch in breadth, intervenes between these two ridges at their origin, from which they gradually diverge, following the direction of the skull. Thus they continue, gradually increasing in size, until they have passed the orbits of the eye, where they enlarge by a lateral swelling, constituting an outer and inferior margin. Their form here is irregularly angular, being broader above, and having an even outer and inferior margin. They diverge now more abruptly from each other in a lateral direction, but in their ascent preserve the obliquity of the line bounding the skull above. Having passed the limits of the skull, they assume a cylindrical, somewhat compressed form, and constitute, on each side, a pedestal three inches in length, which in its whole extent is covered with integuments and hair, and at the extremity is crowned with a notched margin or burr, supporting the horns.

The surface of the skull, between the lateral ridges, is considerably excavated. The depression is deepest about an inch above the nasal bones. The frontal bones are united by a middle suture, extending to the nasal suture, in the direction of which, the skull has a gently rounded rising. This suture corresponds to the middle rib of the forehead, while the depressions on each side are calculated to receive the two lateral folds or ridges. All the sutures appear distinct on the surface, and agree with those of the other species of *Cervus*. The depressions for the reception of the lacrymal furrows are very extensive, and correspond to the remarkable size of these organs in our animal. The os unguis has a short, compressed process at the anterior margin of the orbit. The entire length of the cranium is nine inches. The length of the pedestal, from its origin at the orbit of the eye to the coronal margin, is five inches and one-fourth. The pedestal and horns together have a length of ten inches. The canine teeth are inserted into the jaw at its junction with the intermaxillary bone, to which they are applied for the space of half an inch. From a large and compressed base, which is obliquely fixed into the jaw, they are gradually attenuated, being curved in form of an arch, and tending at the same time obliquely outward.

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They are extremely acute, and afford a powerful means of defence to the animal. A considerable space intervenes between the canine teeth and the grinders, along which the jaw is strongly compressed. The front teeth in the lower jaw, and the grinders in both, agree so completely with these teeth in the other species of *Cervus*, that they require no particular description.

The *Cervus Muntjak* resembles the common Roe in form and general proportions; but when in a state of full size and vigour, it exceeds that animal nearly one-fifth in dimensions. Its body is more lengthened, robust, and fleshy, while its limbs are more delicate and slender. Its name in the Sunda language expresses leaping or bounding; and, according to Mr. Marsden, the *Kijang*, with the Malayan poets, is the emblem of swiftness and wildness. The qualities of agility and sprightliness which characterize the Roe, belong to the *Kidang* in a more eminent degree. It is perhaps the most elegant and graceful animal of the genus to which it belongs. The drawing represents accurately its form and proportions; but it is not easy by a figure or by description to give an adequate idea of its beauty. The shortness of the tail is a defect to the appearance of the Roe; while the *Kidang* is provided with a tail of moderate length, the attitude of which in its rapid motions is highly ornamental.

The outline of the head of our animal is similar to that of the Roe; it is, however, somewhat more lengthened; the pedestals supporting the horns are more elevated, and the peculiar character of the horns distinguishes it at once from all other species of this genus. A reference to the anterior and lateral views which are given on the Plate, will better illustrate the form of the head, than a detailed description. The horns of the adult *Kidang*, in a perfect state, consist of one principal branch with a smaller additional antler, rising on the same base from the coronal margin of the pedestal, and projecting forward and inward. The latter is simple, very short, and from the common base one inch and a half in length. The principal branch, in the adult animal, is four inches and a half, and measured along its curve, five inches long. It rises for the space of two inches, nearly erect, then forms a slight curve outward and forward, and, finally bending suddenly backward and inward, nearly at a right angle, forms a hook with an acute termination, the curve of which varies in different individuals. In its course it has a slight spiral curve, and is marked with deep longitudinal furrows, following in their direction the curve of the horn, tapering above into sharp ridges, having some irregularities in their course, but wanting those tubercles which occur on the horns in most species

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of the Deer. The base of the horns, at the union of the two branches, is compressed, and somewhat irregular. It is terminated by a burr, *meule* in French, of an oblong form, surrounded by a margin decorated with numerous tubercles of irregular size and disposition, forming a rude capital. This is in part concealed by the long bristly hairs which terminate the pedestals. After a certain period in the age of our animal, the horns are shed; but it remains for future inquiries to ascertain if the exchange, as in other species of Deer, is regular and annual: an anomaly which frequently occurs in the form of the horns, favours the opinion that the exchange is not regular. The most common deviation from the form above described, is an inequality in the horns of the opposite sides of the skull. This occurred in the Indian Roe described by Allamand. It also exists in a specimen of the anterior portion of the head, supporting the horns with the integuments of the face and adjoining parts, contained in a very perfect state of preservation in the valuable and extensive Museum of Joshua Brookes, Esq., which he opens with great liberality for scientific consultation. A more singular anomaly exists in one of the specimens preserved in the Museum at the India House. The horn on the right side is perfectly regular; on the left side the principal branch has the usual direction, but it is smaller than that on the opposite side; the anterior antler has the common origin and direction, but it is comparatively short and obtuse; a third antler, rising opposite to this from the same base, is slender, erect, and acute; the coronal base is considerably distorted, and the horn generally has a dwarfish appearance. In the female the place of the horns is marked with a tuft of black hairs. The relative size and direction of the principal branch and the antler, likewise varies occasionally in different individuals.

The horns of the first growth of our animal have a character very different from that now described: they are short, simple, somewhat subulate, nearly erect, or slightly bent inward, and covered with small tubercles. The pedestals are greatly compressed, and destitute of any coronal margin or burr to support them. A skull contained in the Museum of the Royal College of Surgeons, tends to explain the appearances which the horns exhibit in different ages; it belonged to an animal that had recently attained its full size. I have with scrupulous accuracy compared its dimensions in all points, with a perfect skull of an adult animal belonging to the Museum at the India House, and have found them strictly to agree. The peculiarities of the skull at the College are the following:—The sutures are very distinct in all parts, and in several places the bones are still disunited. The canine teeth are completely formed, very perfect, smooth, and entire, and have none of the

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fractures and irregularities which, from long continued use, appear in the other specimens. The first grinder in the upper jaw is not yet developed; it appears partially at the margin of the jaw; the other grinders are very perfect, and crowned with elevated sharp points, not in the least degree worn by mastication. In the lower jaw the points only of the three anterior grinders appear at the margin of the jaw, and, judging from their projection, they were, during the life of the animal, almost entirely concealed by the gums. The slenderness of the pedestals gives them the appearance of greater length than in the adult; but being brought into actual comparison, I found them somewhat shorter. The lateral ridges are comparatively little prominent, and the anterior excavation of the skull is inconsiderable.

A drawing of the skull of the *Cervus Muntjak*, or Kijang, published in the year 1811, by Mr. Marsden, in the Third Edition of the History of Sumatra, exhibits the skull of the animal with horns of the first growth; and the following statements will tend to shew, that no reasonable doubt can be entertained of the fact, that the drawing was made from a specimen which is now deposited in the Museum of the Royal College of Surgeons of London. In the year 1792, Mr. Marsden received from the Resident of Bencoolen a drawing of the Sumatran Kijang, made by Mr. William Bell, well known by the account of the Sumatran Rhinoceros, which is contained in the Philosophical Transactions for the year 1793. At the same time Mr. John Hunter also received a collection of osteological preparations from the same gentleman, who had been his pupil: among these was contained the skull of the male Kijang, provided with horns and tusks, having precisely the character of Mr. Marsden's figure. The only notice which accompanied the drawing was its representing the skull of the Sumatran Kijang, and its having been made by Mr. Bell; and the result of my inquiries on this subject is confirmed by Mr. Marsden's opinion, that it is in the highest degree probable that the skull which he sent to John Hunter's Collection, was the identical specimen which he had thought deserving of being figured. I have accordingly united the *Cervus moschatus* of Dr. De Blainville, which was founded exclusively on the skull above mentioned, contained in the Museum of the Royal College of Surgeons, with the *Cervus Muntjak*. It is also necessary, by a few concise remarks, to state my reasons for giving, in the preceding references, the name of the *Cervus subcornutus* of Dr. De Blainville, as a synonym of the *Cervus Muntjak*. The *Cervus subcornutus* was established, with the *Cervus moschatus*, from a cranium in the Hunterian Collection; and as Dr. De Blainville has with great caution observed, that both species should be admitted only provisionally, I have extracted from the Bulletin des Sciences his original description,

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and subjoined it in a note.* A very careful comparison, and a nice application of measures, both to the skull contained in the Museum of the College, which served for Dr. De Blainville's description, and to the skull of the Cervus Muntjak, has in a satisfactory manner convinced me that they belong to individuals of the same species. The imperfect state of the anterior portion of the skull contained in the Museum of the College of Surgeons, renders the characters, drawn from the defect of the canine teeth, liable to serious doubts, which are stated by Dr. De Blainville himself in the provisional definition of the species.

The face affords a peculiar character to the Cervus Muntjak; it differs in a small degree in the living animal, and in the prepared specimens found in collections. In the former there exist two rough folds of the skin, which are considerably distended and elevated; they are separated about an inch and a half above; and

* *Extrait d'une memoire: sur plusieurs espèces d'animaux mammifères de l'ordre des Ruminans;*
par M. H. De Blainville.

“ Dans la seconde section du g. Cerf M. De Blainville, donne les caractères de deux espèces dont il n'a vu, il est vrai, que le crâne plus ou moins complet.”

“ Le première, qu'il propose de désigner sous le nom de *Cervus Moschatus*, a des bois très-courtes, simples, coniques, un peu courbés en dehors et en arrière, très tuberculeux, sans meules à leur base, portés sur de très-longes pédicules comprimés, s'excavant en dedans et dont la racine se prolonge de chaque côté du chanfrein, de manière à former une sorte de gouttière dans toute la longueur de celui-ci. La mâchoire est en outre armée de deux longues canines tout à fait semblables à celles du *M. Moschiferus*. M. De Bl. a vu de cette espèce une tête osseuse bien complète, provenant de Sumatra, mais sous aucune autre espèce de renseignement.”

“ La seconde qu'il nomme *C. subcornutus*, ne lui est également connue que par un crâne, mais sans os incisifs et sans mâchoire inférieure. Les bois de cette espèce sont sensiblement plus grands et plus forts que dans la précédente, ils ont une meule bien formée, un petit andouiller simple, conique, un peu recourbé à la partie antérieure de la base du merrain, qui est terminé supérieurement par une pointe conique et fortement recourbée en arrière et en dedans; le pédoncule qui les porte est beaucoup plus fort, plus épais, mais un peu moins long et plus surbaissé, que dans l'espèce précédente; sa racine forme de chaque côté du chanfrein une arête encore plus saillante, mais moins prolongée.—Il n'y a aucune trace des dents canines, et en outre, la comparaison minutieuse des différentes parties de ce crâne ne permet aucune espèce de rapprochement avec le précédent.”

“ M. De Bl. cherche ensuite si ces deux espèces étoient connues: il lui semble évident que la seconde a au moins beaucoup de rapports avec le Chevreuil des Indes de Buffon, observé et décrit vivant par Allamand, et qu'il paraît que Gmelin a désigné sous le nom du *Muntjac*, sans cependant citer cet auteur, mais qu'elle ne lui est pas parfaitement identique. En effet le Chevreuil des Indes a ses bois, à ce qu'il paraît, entièrement conformés comme le *C. subcornutus*; mais celui-ci n'a aucune trace de dents canines, dont celui-là est pourvu; ainsi, à moins qu'on ne considère la tête décrite par M. De Bl., comme ayant appartenu à un individu femelle du Cerf. Muntjak, et qui alors aurait des bois, on doit la regarder, au moins momentanément, comme une espèce distincte; quant à la première, c'est à dire *C. Moschatus*, M. De Bl. n'a trouvé aucun auteur qui en fasse mention.”

Bulletin des Sciences, par La Société Philomatique de Paris. Année 1816, p. 77 et 78.

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following the direction of the prominent sides of the forehead, they unite below, so as to mark the face with the letter V. In the dried subject the folds are contracted, and three distinct ribs appear, which have suggested to Pennant the name of Rib-faced Deer: they are carefully represented in the drawing. The face is broad above, and gradually contracted towards the muzzle: at the sides it is bounded by two ridges, between which a considerable depression is observed, corresponding in form and outline to the skull. It is pervaded by two grooves, nearly one-fourth of an inch in depth, which arising opposite to the superior angle of the eye, gradually approach each other. In the middle of the face is a less distinct line: it rises on the forehead, and following the direction of the frontal suture, terminates with the lateral grooves at the lower extremity of the lacrymal sinus. The grooves are lined with delicate hair; their surface is glandular, and affords a peculiar secretion. The muzzle is nearly smooth, slightly tapering, and naked from the commencement of the nostrils to the tip, which is obtuse. The nostrils are lateral, narrow above, slightly curved, broad and rounded at the extremity. The eyes are remarkably beautiful and brilliant, and the irides brown. The lacrymal furrows have the same situation as in the stag, and are of great extent; they constitute a cavity, or sac, of a semilunar form, of considerable depth, surrounded at the external aperture with a series of bristly hairs, and lodged in a deep corresponding cavity of the skull: the form of this is distinctly exhibited on the Plate of Illustrations. A few straggling delicate bristles are scattered over the face near the nostrils, and over the lower lip and chin. The ears are of moderate size, erect, oval, and internally bordered with a series of beautiful white hairs. The face is marked with two black lines, following the direction of the lateral ridges, and continued along the pedestals to the coronal margins by which they are terminated. The general colour of our animal is reddish brown, but it varies on different parts in its intensity. The specimens belonging to the Museum at the India House have a reddish brown tint, inclining to fulvous; it is glossy, and more saturated along the highest part of the neck and back; the sides are lighter, inclining to fawn colour, and the under parts of the abdomen and neck have a tawny hue. The inside of the thighs, the region of the pubes, and the under side of the tail, are white: the chin and lower jaw are whitish. The head and upper portion of the face have a darker reddish brown tint than the back; towards the muzzle the colour becomes black, with a variegation of gray. The lower part of the thighs and the legs are dark brown, slightly variegated with gray, which tint becomes more saturated towards the extremity; but a streak of reddish brown extends along the legs posteriorly towards the tarsus, where it becomes dark and blackish. The hoofs have a blueish horny colour; they are elevated and delicate; the spurious hoofs are minute and distant; the tarsus has a direction obliquely

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forward, which, with the delicacy of the legs, increases the sprightly appearance of our animal. The texture of the hairs is firm; they are rigid, bristly, and closely applied to the body, so that the appearance of the Kidang is generally sleek. A naked horny point serves to attach them to the skin, as in the European Roe; this is perfectly white; towards the extremity the tint has different shades and modifications, agreeably to the external colour. The hairs are arranged in close contact, but have no woolly appendage at the base, and thus constitute a covering adapted to the climate; they are lengthened on some parts, and their distribution affords various ornamental tufts to our animal; one of the most conspicuous of these is along the course of the pedestals of the horns, and at their termination.

The colour of the *Cervus Muntjak* varies in different periods of the year, and in different countries. The female also, at least in Java, is darker than the male. The reddish brown tint of the male, in the female is diversified with gray. This is the colour of the Indian Roe described by Allamand; and while our animal agrees with that in the structure of the horns, in the size and disposition of the lacrymal furrows, and in all the essential characters, it cannot be considered as specifically different, in consequence of a slight modification of colour. The drawing already mentioned from the collections of Dr. Hamilton, representing the head of the Rib-faced Deer, agrees in the reddish brown tint with the Javanese animal; but the lines passing along the face and horns are dark brown instead of black. The preparation in the Museum of Mr. Brookes has the same tint; but the form of the horns, and the ribs of the face, agree strikingly with our animal. As far as I have been able to determine from the specimens, figures, and from descriptions, I consider the *Chevreuil des Indes* of Allamand, the Rib-faced Deer of Pennant and Hamilton, and the Kidang, or Kijang, of the Indian Islands, as belonging to the same species, the *Cervus Muntjak* of Zimmerman.

Although the *Cervus Muntjak* resembles the *Cervus Capreolus*, or Roe, in many points, yet in determining its situation in a natural series, it is necessary to take a general view of all the species of *Cervus* hitherto discovered: it will then appear, that in several essential characters our animal differs from the Roe, and resembles the *Cervus Elaphus*. Among the characters, from which the species of *Cervus* have been arranged into groups, the elevation of the horns on pedestals is one; but it does not associate the species in a natural manner. This character occurs in the *Cervus Capreolus*, in the *Cervus Pygargus*, in several American species of Deer resembling the Roe, to which the *Cervus subulatus* of Mr. Brookes belongs, and in the *Cervus Muntjak*. But this character is of a relative nature; and a pedestal

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supporting the horns exists in all species of *Cervus*, as is rendered evident on examination of the skull. The characters which most obviously distinguish the *Cervus Capreolus* and the *Cervus Muntjak*, are the canine teeth and the lacrymal furrows: the latter are entirely wanting in the *C. Capreolus*, while their amplitude in the *Chevreuil des Indes* and in the *C. Elaphus* is pointed out by Allamand in the following terms.—“Au-dessous (les yeux) sont deux larmiers très remarquables par leur grandeur et leur profondeur, comme ceux du Cerf;” and the canine teeth of the latter, although short, afford another important character of agreement between it and the *Cervus Muntjak*.

DIMENSIONS.

	Feet	Inches	Lines.
Length of the body and head, from the extremity of the nose to the root of the tail.....	4	0	0
..... the tail	0	7	0
..... from the extremity of the nose to the point of the horns	1	3	0
..... the head	0	9	6
..... the naked skull	0	9	0
..... the pedestal of the horns, from its origin at the orbit of the eye, to the coronal margin	0	5	3
..... the naked pedestal projecting beyond the skull	0	3	0
..... the pedestal with the horn	0	10	0
..... the principal branch of the horns	0	4	9
..... the short branch, or antler	0	1	6
..... the lengthened canine tooth, or tusk	0	1	0
Distance from the extremity of the muzzle to the commencement of the lateral ridges of the skull.....	0	3	6
Height before, at the anterior extremities	2	2	0
..... behind, at the posterior extremities	2	5	0
Circumference of the body before	2	6	6
..... behind	2	9	0

The preceding description exhibits the resemblances and differences which exist in form and external characters between the *Cervus Muntjak* and the European Roe. From the following details it will appear, that these two animals have similar natural dispositions, manners, and peculiarities; and that the *Muntjak* holds in the Indian Islands the same place which the *Cervus Capreolus* occupies in Europe.

The *Cervus Muntjak* selects for its resort certain districts, to which it forms a

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peculiar attachment, and which it never voluntarily deserts. Many of these are known as the favourite resort of our animal for several generations. They consist of moderately elevated grounds, diversified by ridges and vallies, tending towards the acclivities of the more considerable mountains, or approaching the confines of extensive forests. Such districts are by no means uncommon in Java; they are covered with long grass, and shrubs and trees of moderate size, growing in groups or small thickets, and they generally intervene between cultivated tracts and the deep forests. Their vegetation is peculiarly adapted to afford to our animal a very abundant supply of nourishment: their surface is covered with long grass, *Saccharum spicatum*, well known to persons who have visited the interior of Java by the name of *Allang-Allang*, and the groves and thickets abound with *Phyllanthus Emblica*—*Linn.*; these two plants constitute its principal food. They also produce many species of *Hibiscus*, *Grewia*, *Urena*, and other malvaceous plants, all which are greedily eaten by the Kidang. About the middle of the dry season, in the Javanese winter, just before the foliage is renewed, the shrubs and herbaceous plants covering the plains and small woods are, according to an old and universal custom in Java, set on fire, and thus these tracts are prepared for a new vegetation, which appears shortly before the annual rains, in a period that may be compared with an European spring; after the lapse of a few weeks, the ground and shrubs are covered with fresh verdure, and a most abundant supply of food is ready for the Kidang. These districts, being in most cases sparingly supplied with water, do not invite an extensive population: the Kidang is not molested by a few solitary hamlets, but the leaves of the *Convolvulus Batatas*, and of many leguminous and cucurbitaceous plants, which always surround the dwellings of the natives, afford it an occasional repast. Many of these hamlets might be enumerated, which would afford a pleasant recollection to those persons who have visited the native Courts, or the eastern capitals. Jebres, Kayu-urib, and Pring-ombo near Surakarta, and Kali-wungu near Samarang, are among the most favourite.

The native inhabitants of the hamlets dispersed through the districts in which the Kidang is found, do not possess means to undertake the chase; but it affords a favourite amusement both to Europeans and to natives of rank, who engage in it in different modes with great ardour. The *Cervus Muntjak* has a strong scent, and is easily tracked by dogs. When pursued, it does not go off, like the Stag, in any accidental direction; its flight indeed is very swift at first, but it soon relaxes, and, taking a circular course, returns to the spot from which it was started. The natives, acquainted with the character of our animal, describe it as possessing a great portion of craftiness, combined with much indolence. After several circular

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returns, if the pursuit be continued, the Kidang thrusts its head into a thicket, and in this situation remains fixed and motionless, as in a place of security, and regardless of the approach of the sportsmen. If it remains unobserved, it is still unwilling to quit its haunts; and experienced hunters, acquainted with its natural disposition, after an unsuccessful pursuit, return the following day, and in many cases find the Kidang near the same spot.

The chase of the Kidang, by means of dogs, affords occasionally a favourite amusement to the natives of rank in Java. Many of these, especially in the more distant provinces, keep large packs for this purpose, which are regularly trained. The dogs, vulgarly denominated pariahs, are the indigenous breed of the Island, in a state of imperfect domestication: there are several varieties; one of these greatly resembles the Sumatran dog, of which a description, accompanied by a figure, is given by General Hardwicke, in the XIIIth Volume of the Transactions of the Linnean Society: the body is lank, and the ears erect; they are ferocious in their disposition, and rarely shew any attachment to their masters. The natives of Java, like other Mahomedans, entertain prejudices unfavourable to dogs; they rarely treat them with kindness, or allow them to approach their persons; and it is only in extraordinary instances, or when they contribute to their amusement, that they feed or care for them; generally they are ill treated, and left to provide for themselves, so that their famishing condition is disgusting to Europeans. Many of these dogs are extremely ardent and courageous in the pursuit of the Kidang: when the chase commences, they are led with a line by an attendant to the spot; the peculiar exhalations soon discover the Kidang; the dogs are discharged, and commence the pursuit with great ardour, while the sportsman follows more deliberately, and generally when he comes up with them, finds the dogs at bay with the Kidang. The male animal possesses a great share of courage, and with its tusks makes a most vigorous defence; many dogs are wounded in the attack; the sportsmen uniformly are provided with remedies and applications, and by a simple suture attempt to unite those wounds which are not immediately fatal: in this operation they frequently succeed, and preserve their most valuable dogs; but in many cases the Kidang makes fatal lacerations in the neck and breast, or lays open the abdomen. But although possessed of great courage, the life of the Kidang is not tenacious, and the sportsman on arriving at the spot, generally dispatches it with small shot. The natives of the more distant districts are in the habit of bringing their best dogs to the capitals, on occasion of their half-yearly attendance, to perform the feudal services to the Sovereigns, when their sports afford an occasional amusement to the European inhabitants.

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Other modes of chase are also employed by the natives of rank. One in particular is common in the western parts of the Island; a district is surrounded by a line of hunters, and the Kidang is driven in towards a central spot; forty or fifty animals are in this manner often obtained at a single pursuit. Many of the hunters are mounted, and the horses are trained to the chase. The sportsman endeavours to overtake the animal, and to kill it by a stroke with a sword. The inhabitants of Pugar and Blambangan, two provinces at the eastern extremity of Java, possessing a small population, but abounding in extensive plains and acclivities, which afford an ample range and abundant pasture to the Kidang, are particularly skilled in this sport. The best horses are trained for it: the sportsman, without a saddle, mounts on the naked back, and carries on the pursuit with a frantic impetuosity, at the risk of his limbs and neck. During my visit to these districts, I was frequently entertained by aged natives with narratives of their favourite sport, and of the dangers and accidents they had encountered on many occasions; but these had not diminished their ardour for this amusement. The native Stag of Java is pursued in the same manner.

In Banka a less arduous, but more destructive method is employed to take the Kidang. A long rope of rattan is suspended, at a proper height above the ground, between two trees; numerous nooses, of the same material, hang from this, in a close and continued series, and the Kidang, driven towards it, pursued by dogs, and blinded by fear, does not perceive the slender rattan, and thrusting his head into a noose, is strangled on the spot.

The Kidang has other enemies and pursuers besides man; the tiger and leopard also approach its retreat, and many are annually destroyed by them. But in a mild climate, a constant and regular supply of food abounds, and no great variation or decrease is observed in their number. They are found in pairs, or in small troops, rarely exceeding a single family.

The Kidang is impatient of confinement, and is not fitted for the same degree of domestication as the Stag. It is, however, occasionally found in the inclosures of natives and Europeans, but requires a considerable range to live comfortably: it is cleanly in its habits, and delicate in the choice of food. The flesh affords an excellent venison, which is often found on the tables of Europeans. The natives eat the males, and always present them in a conspicuous place in their feasts; but in consequence of some peculiarities in the habits of the females, they have an aversion to them as food.



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FALCO ICHTHYÆTUS.

ORD. I^{er} LES OISEAUX DE PROIE, *Cuvier*. 1^{er} Famille. Les Diurnes.
2^{de} Division. Les Faucons.

ORD. I^{er} RAPACES, *Temminck*.

ORD. I. ACCIPITRES, *Linn. Syst.*

ORD. III. RAPTATORES, *Illiger*. Fam. 18. Accipitrini.

FALCO, *Linn. Lath. Cuv. Temminck, Illiger*.

CHAR. GEN.—*Rostrum* mediocre, crassiusculum, aduncum, compressum, basi cerigerum, tomis maxillaribus sæpius dentigeris.

Nares laterales, ad marginem anticum ceromatis sitæ, rotundatæ, patulæ, apertæ.

Lingua cartilaginea, apice acuta sæpius fissa.

Caput plumis densis tectum.

Pedes mediocres, validi, insidentes, sæpius hirsuti aut semihirsuti. Tarsus digito medio longior. *Acrotarsia* aut scutulata, aut clypeata, aut reticulata *Acroductyla* scutulata. *Ungues* validi, incurvi, acutissimi. *Pelma* torulosum scabrum (*Illiger*).

Falco fuscus, cera cærulea, pedibus flavescentibus, ventre postice crisso cruribus caudaque præter apicem albis, capite canescente.

Jokowuru, of the Javanese.

Falco Ichthyætus, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 136.*

IN the concise description of a collection of birds from Java, which is contained in the XIIIth Volume of the Transactions of the Linnean Society, the Falco Ichthyætus is arranged among the BALBUSARDS of the celebrated Cuvier, which belong to the Aquilæ of Bechstein and Temminck. As our bird, and the Falco

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Haliætus, are very different in physiognomy, it may be proper, in this place, to enumerate the considerations by which I have been guided in this arrangement. The chief of these have been the agreement which exists in the structure of the claws, and in the habits and mode of life, between the Javan and European bird. To shew the former, I refer to the authority of M. Cuvier; and the latter, which I have personally observed, is further supported by the testimony of M. Temminck. The peculiar character of the claws in the *Falco Haliætus*, is given with great precision by the celebrated writer first mentioned:—"leurs ongles sont ronds en dessous, tandis que dans les autres oiseaux de proie, ils sont creusés en gouttière:" and Mr. Temminck, in his "*Observations sur la Classification méthodique des Oiseaux &c.*" in speaking of the *Balbusard*, (as forming one of the genera of Mr. Vieillot), has the following remark, which, as it applies, in my opinion, to our bird, I shall extract entire:—"chez cet oiseau, les formes des pieds et du bec s'accordent en tous points avec notre balbuzard, hormis l'égalité de longueurs des ongles, qui dans cette espèce sont inégaux. Je sais positivement que cet oiseau de proie de Java, vit comme notre balbuzard, il est modellé comme lui, excepté qu'il a les ailes plus courtes, mais ses tarses et ses doigts, quoique beaucoup plus forts, sont en tout point semblables à ces parties dans notre balbuzard; le plumage est très-different."

The peculiarities of our bird will appear from the following description. The largest individual of the *Falco Ichthyætus* which I have examined, (a female, to be mentioned in the sequel, which I obtained at the Lake of Damak), measures two feet ten inches in length: the extent of the expanded wings is six feet, and the bill measures from the gape to the claw two inches. In general form the bill agrees with that of the *Balbusard*, but it is proportionally longer, and more robust; the upper mandible is abruptly inflected beyond the middle, has a long claw, and strongly curved cutting edges or *tomia*. The lower mandible is obliquely truncated at the point. The nostrils are large, and irregularly angular at the sides. The cere is blueish, rather obscure, naked above, and bordered with hairs laterally. The wings are several inches shorter than the tail. Of the quill-feathers the first is of moderate length; the second is somewhat shorter than the third, fourth, and fifth, which are longest, and nearly equal. The emargination is slight on the external, and deep on the internal vanes of the quill-feathers, from the second to the seventh. The tail exceeds the wings more than two inches in length; it is truncated, having a small rotundity at the sides. A peculiar character of our bird exists in the length and stoutness of the feet and legs. The tarsi are partially covered with plumes at the base. The toes are of great length and strength; the middle toe is longest; the lateral ones on each side are nearly of equal length, and the hind toe is proportionally robust. The feet are very rough underneath, being covered with sharp protu-

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berances. The claws are of uncommon size, strongly curved, regularly cylindrical, and possess in a great degree the peculiarity belonging to the Balbusards of northern climates. From the examination which I have been enabled to make of various specimens, it appears that in *Falco Ichthyætus* they are truly cylindrical, while in *Falco Haliætus* they are laterally compressed. They are admirably calculated for a rapid seizure, and a firm hold. The claw of the middle toe has a small groove internally. Regarding their relative size, it is to be noted, that of the anterior toes, the claw of the interior is largest, and they successively decrease to the exterior. The claw of the hind toe is scarcely perceptibly larger than that of the interior toe before.

The general colour of the *Falco Ichthyætus* above is brown, but it has different shades and degrees of intensity. The posterior portion of the abdomen, the vent, the thighs, and the tail, to within two inches of the extremity, are white. The head is brown, with a tint of plumbeous gray, which is darker above, and paler at the sides and underneath. The plumes of the upper part of the head are long, acute, with the vanes on each side irregular, and in some individuals appearing as if corroded. A space, nearly naked, extends from the anterior angle of the eye to the base of the bill. Long decumbent vibrissæ are scattered in small numbers on this naked space, and on the forehead, the cheeks, the base of the bill near the gape, and the throat. The cere is blue, and rather obscure. The irides have a bright sulphur yellow colour. On the neck, breast, and the anterior part of the back and abdomen, the brown inclines to ferruginous. On the wings the colour is more intense, and in certain positions regarding the light, has a blueish cast. The wings underneath are hoary. The brown is saturated and pure on the back, and on the extremity of the tail and of the quill-feathers; the shafts of the latter are nearly black. The posterior white portion of the abdomen is separated from the anterior parts by a determinate boundary line, extending almost regularly across the abdomen. The feet are light blue, with a yellowish lustre. The scales are remarkably prominent and defined. The colour of the claws, which, from their cylindrical form and strong curvature, give a marked character to this bird, is deep blackish blue, and shining. The bill has a leaden hue. The female uniformly exceeds the male in size.

The *Falco Ichthyætus* is found in Java, always near lakes, or on the banks of large rivers. It is by no means generally distributed. I met with it in two situations only: one of these was on the banks of the largest river of the eastern parts of the Island, the River of Kediri. Here it was very numerous, and I obtained most of the specimens which I afterwards brought to England. I fre-

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quently surprised it, perched on the extremity of a dead branch, in the attitude in which it is represented in the figure which illustrates this article, watching its prey. But I had previously become acquainted with its appearance and manners. During my residence on the hills of Prowota, situated about twenty miles south-east of Semarang, I found a single pair of these birds, which had established themselves for several successive years, near a village on the confines of an extensive lake, formed by the annual accumulation of water during the period of rains, and distinguished by the name of Rawa (lake) of Damak. The birds had built their nest on the summit of a very large tree, where their motions were often watched by the natives; and by the assistance of one of these, I obtained both the male and female bird, and examined their nest. The latter was constructed in a rude manner of branches of trees. The branches which were placed on the exterior, were more than an inch in diameter; the inside was lined with small twigs: it was irregularly round, and very slightly excavated. The birds were surprised during the period of incubation. The male was procured living, and kept in confinement several weeks; the female was unfortunately strangled in the snare which was set for it. The nest contained one young bird, recently hatched, and a single additional egg, which being placed under a hen, was hatched in twenty-four hours. The male bird, on being caught in the snare, permitted itself to be seized by the native who ascended the tree, without making any resistance. It was brought to me without delay. The bird at this time lay in the arms of the native, apparently conscious of its situation, and without making use of its claws or bill, or exerting any efforts to extricate itself. It suffered itself to be handled and examined very patiently. Being placed in a large cage, I had an opportunity of observing it during several weeks. It made a few efforts in the beginning to set itself at liberty; but finding them ineffectual, it soon, by its calmness and dignity of manners, exhibited a resemblance to the more noble species of Falcon. It stood quiet in its cage, regarding every thing that passed with a steady look: if a person approached very near, it retired gradually, without shewing any alarm. During the first two days of its confinement, our bird refused food altogether, although it was plentifully supplied with fish. After the expiration of this time, it opened its bill when a fish was offered to it; and although very hungry, it seemed to distrust this unaccustomed mode of taking food. A small fish being now carefully placed in the bill, without any resistance on the part of the bird, was permitted to remain a considerable time, and after much hesitation, was finally swallowed with great caution. By mild treatment the bird gradually became accustomed to this mode of taking food, and after several days it had acquired sufficient confidence to take a fish from the hand of any person that offered it. Its usual attitude was with the bill half opened. The bird appeared to have frequent thirst, and took up copious draughts of water with its bill.

FALCO ICHTHYÆTUS.

The pair of birds which I here obtained, had been carefully observed by the natives of the village of Brambatan for several years. Their cry resembled that of the Osprey. They lived exclusively on fishes, which they obtained abundantly out of the lake above mentioned. They never attacked fowls or other animals. They daily resorted to the lake, over which, suspended in the air, or sailing slowly along, they watched their prey: on observing a fish, they darted on it with impetuous velocity. More rarely they pursued a more passive conduct, and watched the lake from the trees in its neighbourhood. The nest of this pair of birds had before my arrival been repeatedly visited by the natives. The female was observed to lay two eggs at a time, and the young birds were driven from the neighbourhood as soon as they were able to provide for themselves. In our Plate the Falco Ichthyætus is represented very nearly one-third of the size of life.



FALCO CARULEUS, F. N. S.

FALCO CÆRULESCENS.

ORD. I^{er} LES OISEAUX DE PROIE, *Cuvier*. 1^{re} Famille. Les
Diurnes. 2^{de} Division. Les Faucons.

ORD. I^{er} RAPACES, *Temminck*.

ORD. I. ACCIPITRES, *Linn.* Syst.

ORD. III. RAPTATOIRES, *Illiger*. Fam. 18. Accipitrini.

FALCO, *Linn. Lath. Cuv. Temminck. Illiger*.

CHAR. GEN.—Vide Falco Ichthyætus.

Falco nigro-cærulescens subtus ferrugineus, hypochondriis tibiis postice plagaque
lateralis colli atris, remigibus rectricibusque intus albo fasciatis.

Allap, or *Allap-allap*, of the Javanese.

Falco cærulescens, *Linn. Syst.* 1. p. 129. 9.—*Gmel. Syst.* 1. p. 285.—*Lath. Ind.*
Orn. p. 50.—*Gen. Zool. Vol. VII. Part 1*, p. 208.

Falco Bengalensis, *Briss.* VI. *App.* p. 20.

Falco parvus indicus, *Ger. Orn.* 1. p. 66. t. 44. f. 1.

Little black and orange Indian Hawk, *Edw. t.* 108.

Bengal Falcon, *Lath. Syn.* 1. p. 112. 97.

IN giving in the present Number of these Researches the figure of the Falco cærulescens of Linnæus, I have in some degree deviated from the plan which I proposed to myself at the commencement; but as I have been enabled to offer to the patrons of the Work four original figures in Ornithology, I concluded it would not be unacceptable to them to meet, at the side of the largest species of Falcon which Java produces, another bird, remarkable on account of its minuteness and beauty. The Public has long been acquainted with the Falco cærulescens, which is considered as the smallest of the genus, and was first described by Edwards in his Natural History of Birds, published in the year 1750, from a specimen forwarded to DR. MEAD from Bengal.

FALCO CÆRULESCENS.

The *Falco cærulescens*, as it occurs in Java, has presented to me the following observations. It has a very robust fabric. The bill has a double notch, which is deeper than in any other species belonging to the "*Falcones proprie sic dicti*" of *Bechstein* that I have examined. The entire length is six inches and an half. Upper parts blueish black, and glossy. Throat, breast, axillæ, sides of the neck, forehead, and a line continued from the environs of the bill over the eye and along the neck, white, with a ferruginous tint. Lower part of the breast, abdomen, vent, and thighs, ferruginous. Hypochondria, thighs posteriorly, and a broad patch extending from the eye along the side of the head, black; the plumes which cover the thighs behind, are terminated by long silky filaments, or radii, which are straggling and pendulous, and by their laxity and irregularity afford a peculiar character to our bird. This is not noticed by Edwards in the description of the specimen which he delineated. From the General Zoology it appears that in one specimen, which was considered a male bird, the under parts agreed with the bird as found in Java, excepting the colour and distribution of the plumes just mentioned. In the bird figured by Edwards, the under parts were bright orange-yellow, and it exceeded our bird nearly one inch in length.

I became acquainted with the *Falco cærulescens* in the year 1806, in the eastern districts of Java: here I obtained a single individual. I had no opportunity of observing its manners personally, but the natives described it as uncommonly bold in the pursuit of small birds. During the latter period of my abode at Surakarta, several individuals were brought to me from the range of southern hills, which are covered with forests. In other parts of the Island I have not observed it.



L. B. S. de

Printed by C. Hullmandel

FALCO LIMNÆTUS.

London. Pub. by Kingsbury, Parbury, and Allen, Leadenhall Street, April, 1892.

FALCO LIMNÆETUS.

ORD. I^{er} LES OISEAUX DE PROIE, *Cuvier*. 1^{re} Famille. Les Diurnes.

2^{de} Division. Les Faucons.

ORD. I^{er} RAPACES, *Temminck*.

ORD. I. ACCIPITRES, *Linn. Syst.*

ORD. III. RAPTATOIRES, *Illiger*. Fam. 18, Accipitrini.

FALCO, *Linn. Lath. Cuv. Temm. Illig.*

CHAR. GEN.—*Rostrum* mediocre crassiusculum, aduncum, compressum, basi cerigerum, tomis maxillaribus sæpius dentigeris.

Nares laterales, ad marginem anticum ceromatis sitæ, rotundatæ, patulæ, apertæ.

Lingua cartilaginea, apice acuta sæpius fissa.

Caput plumis densis tectum.

Pedes mediocres, validi, insidentes, sæpius hirsuti aut semihirsuti. *Tarsus* digito medio longior. *Acrotarsia* aut scutulata, aut clypeata, aut reticulata. *Acrodactyla* scutulata. *Ungues* validi, incurvi, acutissimi. *Pelma* torulosum scabrum. *Illiger*.

Falco fuscus, cauda subtus præter apicem albido-cinerea, tarsis usque ad extremitatem dense plumosis.

Wuru-rawa, of the Javanese.

Falco Limnæetus, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 138.*

Autour Unicolore, *Nouveau Recueil de Pl. coloriées d'oiseaux, &c. par C. J. Temminck et M. Laugier, &c. &c. 23 Livr. Pl. 134, Mâle adulte.*

Lake Falcon, *Gen. Hist of Birds by J. Latham, M. D. Second Edition, 1821, Vol. I. p. 164, n. 89.*

THE Falco Limnæetus is full two feet in length. The bill is shorter than the head, strongly compressed, and regularly curved from the base to the apex, which

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is acute and lengthened. The cutting edges of the upper mandible are deeply emarginate: the lower mandible is entire, and the point obliquely truncated. The cere is rather narrow. The nostrils are large, oval, and transversely disposed. The wings are shorter than the tail. The quill feathers, from the first to the sixth, are notched internally, and from the second to the seventh externally; the first is short; the second and third increase successively; the fourth and fifth are nearly equal, and longer than the others; from the fifth they gradually decrease in length. The legs are somewhat elevated, and the tarsi are closely covered with plumes to the extremity. The anterior claws are small, and nearly of equal size on all the toes; the claw of the hind toe is slightly enlarged.

The general colour of the *Falco Limnæetus* is dark brown: this covers every part except the base of the tail underneath, the eyes, the bill, and the feet and claws. It is deeper on the summit of the head, and on the extremity of the quill and tail feathers. In a certain position towards the light, the colour has a fulvous lustre. The tail consists of twelve feathers, which underneath are white at the base, and throughout nearly two-thirds of their length. The irides are yellow. The eye is surrounded by a space of a brown colour, on which the plumes are scattered very sparingly. The cere is blueish.

The *Falco Limnæetus* is described by M. Temminck, in the 23d Livraison of the new *Série* of coloured Plates of Birds, with the appropriate denomination of *Autour Unicolore*, and Mr. T. has preserved, for the systematic name, that which was given to our bird in the Catalogue of Javanese Birds, contained in the XIIIth Volume of the Transactions of the Linnean Society. It was not till after the drawing which illustrates this article had been completed, that I had an opportunity of consulting M. Temminck's description. This distinguished Ornithologist, whose remarks are always in the highest degree instructive, has entered into some discussion regarding the identity of the *Falco Limnæetus* and the *Falco niveus*, a new species likewise from Java; and he has suspended his final decision until he should receive further information by remarks made on the spot. The facts which fell under my own notice, support the opinion that they are really distinct. Although the *Falco niveus* is not contained in the Catalogue above mentioned, I had an opportunity of observing its manners, and attending to the changes of its plumage, during many months that I had an individual in confinement. A careful drawing was also prepared; but as, by an accidental oversight, no specimen was prepared, the bird was not included in the Catalogue, which embraces those subjects only which are arranged in the Museum at the India House. The history of this bird I propose to give in

FALCO LIMNÆETUS.

another place. I shall now only add, that both the testimony of the natives, and the remarks I personally made on the manners of our bird, have fully convinced me that the *Falco niveus* is a species distinct from the *Falco Limnæetus*.

The extensive materials which M. Temminck received from Java, have enabled him to give a very beautiful figure of our bird, representing it in its most perfect state of plumage. I was limited to a single specimen, in which the slight modification of a reddish tint on the head was less distinct. The external covering is very uniform in our specimen, and it was of a habit less full than that figured by M. Temminck, in consequence of which the tarsi appear considerably elevated. But it sufficiently accords with M. Temminck's description, both in respect to the colour and the proportion of parts; and lengthened tarsi constitute, agreeably to the opinion of this distinguished naturalist, a peculiar character both of the *Falco niveus* and the *Falco Limnæetus*. The bill is represented in our figure, in a small degree too large in proportion to the size of the head. Indeed the *smallness of the bill* has appeared to me to afford a peculiarity; and as M. Temminck has made a remark on the view I have taken of the characters of this Bird, I shall add it in his own words.—“ Les caractères pris des doigts et des ongles de cet oiseau, servent à M. H. pour établir les différences propres à reconnaître cet oiseau de toute autre espèce. Elles peuvent être employées comparativement aux autres espèces de rapaces Javans, mais on n'en saurait faire usage comme moyen de comparaison dans la grande série des rapaces diurnes, parmi lesquels on trouve des espèces à doigts beaucoup plus courts, et à ongles plus égales entre elles.” In the Catalogue, however, already referred to, the bill is mentioned in conjunction with the smallness of the toes, and the plumose covering of the tarsi.—“ A short strongly compressed and strongly curved *beak*, *tarsi* closely covered with plumes throughout their whole length, small *claws*, and those of nearly equal size on all the toes, form the prominent characters of our bird.”*

The *Falco Limnæetus* is a scarce bird. I found it but once resorting to the extensive lakes, formed during the season of the rains, in the southern parts of the Island, where it feeds on fishes. I never met with it throughout the extent of the northern sea-coast.

* Transactions of the Linnean Society, Vol. XIII. p. 138.



A. Peltier del.

Printed by C. Hullmandel.

STRIX BADIA.

London. Pub^d by Kingsbury, Parbury, & Allen. 7 Leadenhall St. June 1829.

STRIX BADIA.

ORD. I^{er} LES OISEAUX DE PROIE, *Cuvier*. 2^{de} Famille. Les Nocturnes.

ORD. I^{er} RAPACES, *Temminck*.

ORD. I. ACCIPITRES, *Linn.* Syst.

ORD. III. RAPTATORES, *Illiger*. Fam. 17, Nocturni.

STRIX, *Linn. Briss. Lath. Cuv. Temm. Illig.*

CHAR. GEN.—*Rostrum* mediocre, crassiusculum, aduncum, compressum, basi setis recumbentibus absconditum, maxilla ceromate oblitterato.

Nares laterales, ad marginem anticum ceromatis sitæ, rotundatæ, patulæ. *Lingua* fissa.

Caput grande, plumis densis tectum, oculis antrorsum spectantibus, orbitis plumis radiatis.

Pedes mediocres, validi, lanati, tetradactyli fissi, digito externo versatili, hallucis brevioris. *Ungues* validi, incurvi, acuti. *Pelma* torosum granulatum. *Illiger*.

Strix badia nigro punctata, subtus pallidior, gula juguloque albidis, torque fusco.

Wowo-wiwi, or *Kalong-wiwi* of the Javanese.

Strix badia, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII.*
p. 139.

THE species of the genus *Strix* which have been afforded to my researches, constitute a large proportion of the Birds of Prey. Nine species of Falcons and eight of Owls from Java have been arranged in the Museum at the India House: of these three belong to the first division of the genus comprising the *Eared-Owls*, and five to the second division, the individuals of which have *smooth heads*. Of the latter the *Strix javanica* of Gmelin, which my specimens shew to be merely a variety of the *Strix flammea* of Linnæus, is the most generally distributed. It is, as far as I have observed, the only species of this division which is occasionally found near villages and dwellings. It is not, however, a favourite with the natives; various superstitious notions are also in Java associated with its visits, and it is considered in many parts of the island as portending evil. The other species of this division are by no means common, and the *Strix badia* is one of those that are most rarely met

STRIX BADIA.

with. It never visits the villages, but resides in the closest forests, which are the usual resort of the tiger. The natives even assert that the Wowo-wiwi approaches this animal with the same familiarity with which the Jallak (the Pastor Jalla of our Catalogue), approaches the Buffalo, and that it has no dread to alight on the tiger's back.

The *Strix badia* is never seen in confinement; the few individuals which I obtained, are from the closest forests of the district of Pugar, and from the ranges of low hills south of the capital of Surakarta. Like most other species of this genus, it is a nocturnal bird.

The *Strix badia* has a general resemblance to the *Strix flammea* in the distribution of its colours and external marks. The upper parts are generally dark, and the lower of a paler hue. The neck is surrounded by a loose ornamental collar; the plumes encircling the eyes are rigid, and disposed with perfect regularity, and the legs are entirely covered. A resemblance also exists in the lustre of their covering; in our bird a chesnut tint prevails, which has suggested the specific name.

The entire length, from the bill to the end of the tail, is eleven, and to the extremity of the claws, twelve inches. The head is proportionally large, and the wings reach almost to the extremity of the tail. The general colour of the upper parts of the head, back, wings, and tail, is chesnut brown, with a bright fulvous lustre irregularly diffused over it, which shews itself more strongly in particular patches. The posterior part of the head is capped with pure chesnut, with a few solitary fulvous plumes intermixed. On the lower part of the back, and on the shoulders, and the anterior margin of the wing, this colour is likewise considerably intense. The upper parts of our bird are irregularly dotted. On the plumes of the neck, the anterior part of the back, and the lesser wing-coverts, the dots are nearly hemispherical, emarginate above, and disposed on the shaft in the middle of the plume. On the greater coverts, and on the plumes of the posterior portion of the back, two spots of an oblong form, and deep brown colour, are separated by a white line on each side of the shaft; and on the lengthened axillary plumes several smaller spots are observed below these, along the shaft towards the base of the plumes. The circle about the eyes and the forehead, which is defined above these by an oblique line on each side, have a pale brown tint, and the plumes which bound the collar of the neck, both above and underneath, are nearly white. The collar is highly ornamental; it consists of a compound series of delicate white plumes terminated by a band of deep chesnut, the accidental derangements of which exhibit a beautiful alternation of the two colours. The circle about the eyes is very

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compact; the base of the separate plumes is chesnut, so as to constitute a dark circle of this colour immediately round the eyes, which is broader at the anterior canthus. On the under parts, from the neck to the vent, the brown colour is greatly diluted, and the fulvous lustre alternates with patches of an Isabella yellow. All these parts are dotted: on the plumes of the neck the dots are simple, and nearly round; on those of the breast and abdomen they are oblong, and several follow each other on the shafts, having an intermediate line of white. The feet are very thickly covered with silky plumes of a fulvous colour. The toes are brownish, and nearly naked; the claws have a yellowish tint, and the intermediate one has a distended rough margin interiorly. The bill is yellowish, and of a moderate size. The quill-feathers and the tail feathers are marked with broad transverse bands of a saturated blackish-brown colour: in the two first of the quill-feathers, as well as in several of the greater coverts, the portion of the exterior vane which is chesnut in the others, is yellowish-white, and the margin of the wing has a conspicuous border of alternate brown and whitish bands.



EURLAIMUS JAVANICUS.

London. Published by Black, Kingsbury, Parbury & Allen, 7 Leadenhall St. Nov. 1821.

PODARGUS JAVANENSIS.

ORD. II^{de} Les PASSEREAUX, *Cuvier*. 2^{de} Famille. Les Fissirostrès.

ORD. III^{me} CHELIDONES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 16, Hiantes.

PODARGUS, *Cuvier*.

CHAR. GEN.—Rostrum breve, crassissimum, subdepressum, grypaneum, aduncum, basi dilatato-ampliatum, capistro recumbente et vibrissis frontalibus porrectis obsitum. *Maxilla* postice arcuatim sub oculos protensa lateribus subinflexis; *culmine* basi subcarinato apicem versus obsolete rotundato; *derthro*, elongato subcylindrico, obtuso, infra canaliculato, deflexo. *Mandibula* basi flexura maxilla leviter exarata, gradatim attenuata, apice suboblique truncata, ad excipiendam maxillæ dertrum emarginata, tomiis rectis subdiaphanis. *Rictus* amplissimus, vibrissæ mastacales nullæ.

Nares submarginales, lineares, horizontales tomiis parallelæ, capistro reconditæ, squama depressa obtectæ, aut rima obsoletiore vix manifestæ.

Alæ subelongatæ. *Cauda* rotundata.

Pedes breves. *Tarsi* subrobusti. *Digit*i breves liberi: halluce debiliore. *Ungues* parvi compressi, rectiusculi, simplices.

Podargus rufescente-isabellinus fusco pulverulentus, cauda undulato-fasciato.

Chaba-wonno of the Javanese.

Podargus Javanensis, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 141.*

SEVERAL species of this genus have been discovered in New Holland: from their appearance, and the general distribution of colours on their plumage, they have been associated with the Goatsuckers. The Baron Cuvier named them *Podarges* in the IVth Volume of the Règne Animal, in the Addenda; but the characters are very slightly indicated, and Mr. Bowdich has given them their proper place in the family to which they belong, and has illustrated the genus by an instructive figure of the bill. As the peculiar characters are detailed in the generic description, I shall here

PODARGUS JAVANENSIS.

only remark, that the bill, from an excessively wide base, tapers gradually to the tip, which is provided with a hooked claw, like that of accipitrine birds; if the bill were more compressed, it would greatly resemble that of the smaller species of owls, the more as it is surrounded at the base by a capistrum of plumes and bristles pointing forward. The sides of the bill rise gradually to a very obsolete back or culmen, and the nostrils are pierced laterally and horizontally, representing a minute fissure covered with a scale. The toes also are completely separate, and the claw of the middle toe is not dentated.

The *Podargus Javanensis* measures nine inches in length. The general colour is ferruginous or rufous, with a tint of isabella; this is variegated by undulated transverse bands of a dark brown colour, which are dotted or confluent, and by several large spots of white or pale yellow, forming a strong contrast with the other parts. On the head above, the back, the wings, and the tail, the general colour of rufous-isabella predominates. On the head and back the transverse bands are very delicate; they are stronger on the upper part of the tail, consisting of narrow undulating lines, including broader bands, the ground of which is dotted, and which alternate with bands of the general rufous tint. At the sides of the head, beyond the ears, are several plumes, terminated by long delicate bristles; and the border of the bill is environed with recurved plumes and bristles which conceal it, and give to the front of the bird an appearance somewhat like that of an owl. A collar of pale whitish isabella, variegated with two very narrow bands of deep brown, passes round the lower part of the neck. Commencing at this collar, several large, irregular, white marks are disposed in an interrupted series from the axilla to the middle of the back. The superior of these marks are formed by plumes of the sides of the neck, and the inferior by several of the wing coverts. They are individually surrounded by a narrow zig-zag border of deep brown inclining to black, forming a strong contrast with the pale colour of the marks. The rest of the coverts are very delicately variegated, and the quill-feathers are dark and brownish towards the extremity. The colour of the bird underneath is somewhat deeper; on the breast and belly several white plumes are scattered, bordered with dotted zig-zag lines of brown and black, which cause a beautiful alternation of colours on these parts. The plumes of the vent are delicate and silky, and the wings and tail are dusky underneath. The feet are rufous, the claws blackish, and the bill has an obscure yellow tint somewhat shining.

The difficulty of observing this bird, from its retired and nocturnal habits, has prevented me from acquiring any information regarding its manners. It appears to conceal itself in large forests, and comparatively with the Goatsucker, is extremely rare: our Collection contains but a single specimen.



A. Pictor del.

Printed by C. Hallman del.

1. MUSCICAPA BANYUMAS.

2. MUSCICAPA HIRUNDINACEA.

London. Pub. by Kingsbury, Parbury, and Allen; 7, Leadenhall Street, Oct. 1823.

MUSCICAPA BANYUMAS.

ORD. II^{me} LES PASSEREAUX, *Cuvier*. 1^{re} Famille, Les Dentirostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn. Syst.*

ORD. II. AMBULATOIRES, *Illiger*. Fam 11, Canori.

MUSCICAPA, *Linn. Briss. Lath. Cuv. Temm. Illig. &c.*

CHAR. GEN.—*Rostrum* mediocre, robustum, grypaneum, depressum, dextro plerumque adunco, tomis pone apicem utrinsecus emarginatis. *Vibrissæ* mastacales patentibus elongatæ. *Nares* basales, laterales, subrotundæ, patulæ, vibrissis mastacalibus partim obtectæ. *Pedes* ambulatorii, mediocres, congrui. *Acropodia* scutulata. *Unguis* posticus incurvus, antico medio major. (*Illiger*.)

Muscicapa supra saturato cyaneo nigricans, subtus badio rufescens, linea frontali alarumque flexura azureis, macula laterali capitis collique aterrima antice orbitas loraque complectente ad rostri basin extensa postice attenuata, remigibus rectricibusque nigris.

Chiching-goleng, of the Javanese, in the province of Banyumas.

Muscicapa Banyumas, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 146.*

Muscicapa cantatrix, *Gobe-mouche Chanteur, Nouv. Rec. de Pl. coloriées d'oiseaux, &c. par C. J. Temminck et M. Laugier, &c. &c. &c. 38 Liv. Pl. 226, mâle et femelle.*

Banyumas Fly-catcher, *Gen. Hist. of Birds by J. Latham, M. D. Second Edition, 1821, Vol. VI. p. 206, N. 81.*

I FOUND the Muscicapa Banyumas only in one province of Java, which is designated by the specific name applied to it in the Systematic Arrangement of Birds from that Island. The natives distinguish it by a denomination—CHICHING-GOLENG—which is also given to the most melodious of the Javanese Thrushes.

MUSCICAPA BANYUMAS.

It has a loud and very agreeable note. During my visit to Banyumas, a province on the western confines of the native Prince's territory, I not unfrequently observed it in the forests which cover the hills in the vicinity of the capital. I was then unacquainted with the locality of its distribution, and from this cause have to regret the imperfection of my materials; for it never occurred to me in the eastern parts of Java, to which my Researches were chiefly confined.

Two specimens only remained to be consulted in the following description. Their appearance is represented in our figure with sufficient accuracy; but it is to be remarked, that on the flexure of the wings, and on the forehead, the light blue tint, inclining to azure, should appear with greater brilliancy. M. Temminck's figure of the *Muscicapa cantatrix*, which has above been cited as a Synonym, represents a defined line along the forehead, extending backward over the eyes, which in our specimens is less distinctly marked. It is also clearly pointed out in his description.

The upper parts are dark indigo blue, with a lighter tint inclining to azure, on the flexure of the wings, and on the frontal band above mentioned. The internal vanes of the intermediate tail-feathers, and the quill-feathers at their extremity, and along the internal margin, as well as the tail underneath, are black. The junction of the mandibles, the base of the bill generally above and underneath, and the region between this and the eyes, are surrounded by delicate velvet-like plumes, of an intense black colour. A mark of the same colour commences at the gape of the bill, stretching first backward to enclose the orbits; and then, descending along the sides of the neck, terminates in a sharp point near the shoulder. Underneath our bird has an orange tint, more saturated and rufous on the throat and breast, inclining to yellow on the plumes of the vent and of the abdomen. The irides are dark coloured, and the feet brown. The bill is black, rather broad at the base, and less elevated and strong than in many other Fly-catchers. It is surrounded by numerous, rigid, decumbent vibrissæ. The claws are large, strongly compressed, and acute. The tail is somewhat lengthened, and the extremity of the wings reaches its middle. The entire length of our bird is five inches and eight lines.

In the female, agreeably to M. Temminck's description, the head and the neck above are grayish, the back olive, and the tail and the wings brown, bordered by reddish; the under parts have generally a paler orange tint, and the mark on the sides of the head and neck is whitish.

MUSCICAPA HIRUNDINACEA.

M. viridi-chalybeo nigra, subtus uropygioque albis.

Muscicapa obscura, Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 146.

Obscure Fly-catcher, *Lath. Gen. Hist. of Birds, 2d Ed. Vol. VI. p. 205, n. 79.*

Muscicapa hirundinacea, Reinw. in Temm. Pl. coloriées, 20^{me} Livr. Pl. 119.

Gobe mouche vélocé, *Temm. Pl. coloriées, 20^{me} Livr. Pl. 119, Fig. 1, mâle; Fig. 2, femelle.*

THE *Muscicapa hirundinacea* is one of those birds which, like the *M. Banyumas*, is rarely observed in the central parts of Java; and I have therefore equally to regret my want of opportunity for observing its habits, and the imperfection of my materials for description. It was first indicated concisely in the Systematic Arrangement of Birds above cited, with the name of *Muscicapa obscura*; but this name having previously been applied to a species essentially different, I have adopted the appropriate denomination of Professor Reinwardt, as it is given in *M. Temminck's Work*.

Our bird has the true character of the Fly-catchers: the bill, in proportion to the size of the body, is long, elevated, and of great strength, but the vibrissæ are not numerous. Our figure gives a faithful representation of the female. In the male the distribution of colours is the same; but the tint above is dark blackish blue, with a greenish cast, as originally stated in our specific character. In the female the upper parts and the wings are brown, with an obscure metallic lustre in certain positions towards the light. Underneath, our bird is white, and this colour also covers the uropygium, and a band on the exterior tail feathers. The separation of colours between the upper and lower parts, along the neck, is formed by a curved line, which, from the middle of the neck, passes obliquely towards the shoulder. In the male, a very faint brownish tint is observed on the breast.

In the form of the tail, and the proportional length of the wings, our bird agrees with the *Muscicapa Banyumas*.



A. Pelissier del.

Painted by H. H. H. H. H.

MUSCIVORA INDIGO.

London. Pub. by Kingsbury Parbury & Allen, Leadenhall St. Oct. 1822.

MUSCICAPA INDIGO.

ORD. II^{me} LES PASSEREAUX, *Cuvier*. 1^{re} Famille, Les Dentiostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 11, Canori.

MUSCICAPA, *Linn. Briss. Lath. Cuv. Temm. Illiger, &c.*

CHAR. GEN. *Rostrum* mediocre, robustum, grypaneum, depressum, dextro plerumque adunco, tomis pone apicem utrinsecus emarginatis. *Vibrissæ* mastacales patentibus elongatæ. *Nares* basales, laterales, subrotundæ, patulæ, vibrissis mastacalibus partim obtectæ. *Pedes* ambulatorii, mediocres, congrui. *Acropodia* scutulata. *Unguis* posticus incurvus, antico medio major. (*Illiger*.)

Muscicapa obscure cæsia, remigibus rectricibusque nigris, his basi axillis ventre crissoque albidis.

Nil-nilan, of the Javanese.

Muscicapa Indigo, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 146.*

THE specific name of our bird is a synonyme of that given to it by the natives of Java. The simple and uniform plumage requires little illustration from description. The general colour is Indigo-blue with an obscure reflection of sea-green, agreeably to the light to which it is exposed. The base of the bill is bordered by very minute plumes of a velvet black colour, which, however, scarcely appear beyond the general covering. The vibrissæ projecting over the nares are rigid, but not very numerous. The bill is greatly depressed, broad at the base, and suddenly attenuated: it approaches to the form of that of the *Platyrhynchi*. On the summit of the head the blue colour is considerably brighter; but it appears obscurely, and is confined to a narrow border on the exterior vanes of the quill and secondary feathers, and on the exterior feathers of the tail. The colour of the wings at the extremity

MUSCICAPA INDIGO.

and underneath is black with a deep brownish lustre. This colour also appears with greater intensity on the two intermediate tail-feathers throughout, and on the others partially. The base of the tail-feathers, with the exception of the two intermediate ones, the abdomen, the vent, and the axillæ are white with an obscure grayish tint, varying in its degree of intensity. In a lateral view of the bird the white colour of the base of the tail is nearly concealed: the belt which crosses the feathers, is narrow in the exterior ones, and gradually increases in breadth towards the middle, passing by an oblique line to the black of the extremity. The coverts of the wings as well as the plumes of the head and neck are black at the base, and bordered with blue at the extremity, in consequence of which these parts appear slightly undulated. The bill is black, the feet very dark brown, and the irides have an obscure tint.

This bird lives solitarily on the most elevated mountain-peaks of Java. It is very rarely observed. Its retired habits lead it into the thickest forests, where the uniformity of its plumage tends most effectually to conceal it. I became acquainted with it at a late period of my ornithological researches. During one of my excursions on Mount Prahu, I discovered a few individuals, perched on the branches of a tree extending across the road. A greater degree of light than usual, admitted on a clear day, into a small opening in the gloomy forest, brought these into view. Being thus directed to the bird, the assistance of the natives procured me several individuals, which are now in the Honourable East India Company's Museum. At a later period I also observed it on the declivities of the Mountain Merbaboo. It emits a feeble plaintive sound in short frequently repeated notes.

The *Muscicapa Indigo* agrees in manners with the Fly-catchers of Europe. It resembles several of them, even in the distribution of the colours of its plumage. In the figure it is accurately represented of natural size.



A. Pictor del

Printed by C. Hullmandel

TURDUS VARIUS.

London. Published by Black, Kingsbury, Parbury & Allen, 7, Leadenhall St. Nov. 1821.

TURDUS VARIUS.

ORD. II^{me} Les PASSEREAUX, *Cuvier*. 1^{re} Famille. Les Dentirostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 11, Canori.

TURDUS, *Linn.*

CHAR. GEN.—*Rostrum* mediocre, cultratum, apice compresso, deflexo, mesorhinio compresso. *Tomia* integerrima, maxillaria utrinsecus pone apicem emarginata. *Nares* basales, laterales, nudæ, superne membrana semiclausæ, inferne foramine ovali patentibus. *Lingua* fimbriata, apice emarginata. *Pedes* ambulatorii, mediores, congrui. *Acrotarsia* aut scutulata, aut supra caligata, infra scutulata. *Acrodactyla* scutulata. (*Illiger*.)

Turdus supra castaneo-testaceus pennis apice atro-fuscis, subtus albidus nigro fasciatus, pectore fascia una hypochondriis fasciis pluribus latioribus, remigibus margine rectricibus extimis totis testaceis, vertice obsolete-cristato.

Ayam-ayaman of the Javanese.

Turdus varius, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 149.*

THE Turdus varius belongs to the first section which Mr. Temminck has established in this genus with the denomination of *Silvains*. It inhabits the thick forests which cover the Mountain Prahu, and, as far as my observations extend, it never leaves a region elevated between 6 and 7000 feet above the level of the ocean. On this circumscribed region it is extremely abundant. Its food consists chiefly of insects and worms. It is easily surprised by the natives: during my last visit to this mountain, I obtained in the course of a few days a great number of individuals. I never found it in any other part of Java.

The entire length is ten inches and three-fourths. The upper parts are of a testaceous brown colour, either uniform, as on the extremity of the wings and on the tail, or transversely barred with deep blackish-brown, as on the head, neck, coverts of the wings, and back. On the head and neck the transverse bands are narrow, and crowded together; they are broader, and less regularly disposed on the upper part of

TURDUS VARIUS.

the back and on the wing coverts. On the lower part of the back, and on the uropygium and its sides, the bands succeed each other again, at nearly equal distances, and they are narrower, and arranged more regularly transverse. The quill-feathers are brown, with an exterior margin of the general testaceous colour; they have also a narrow terminal band of the same. The two exterior tail-feathers have the general testaceous colour of the other parts, rather more diluted; the two following are blackish brown, and on the intermediate feathers the colour is less intense. Underneath, both the quill-feathers and the tail-feathers are brown, inclining to gray. Of the under parts, the ground colour of the throat, the lower part of the breast, the abdomen, and the vent, is whitish: the upper part of the breast has a very diluted testaceous tint; all these parts are transversely barred with the most intense brown, inclining to black. On the throat, in the middle, the transverse bands are very obscure; on the sides are two interrupted lines, between which the bands are more distinct and numerous. On the lower parts of the neck, both in the middle and at the sides, the bands increase in number and breadth. The breast is marked with one principal transverse band; this is followed by several, which are irregular and interrupted, and they increase in number downward on the sides of the breast and abdomen, and on the hypochondriæ: all these parts are crowded with intensely black bands, formed by the extremities of the plumes covering them, and which, by being either regularly transverse, circular, or slightly angular, exhibit a very beautiful succession of marks. In the axilla is a large tuft of plumes with silky barbs, white at the base, and black at the extremity. On the thighs and on the vent the bands are more delicate, and slightly blended with the testaceous tint, which is diffused over these parts. The legs, toes, and claws are brown, with a lustre of wax-yellow. The bill is blackish and shining, resembling horn; the lower mandible, near the base, is of a pale hue.



A. Pellerer del.

Printed by C. Hullmandel.

TURDUS CYANEUS.

London. Pub. by Kingsbury Parbury & Allen, 7, Leadenhall St. June, 1822.

TURDUS CYANEUS.

ORD. II^{me} Les PASSEREAUX, *Cuvier*. 1^{re} Famille, Les Dentirostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. III. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 11, Canori.

TURDUS, *Linn.* &c.

CHAR. GEN.—*Rostrum* mediocre, cultratum, apice compresso deflexo, mosorhinio compresso. *Tomia* integerrima, maxillaria utrinsecus pone apicem emarginata. *Nares* basales, laterales, nudæ, superne membrana semiclausæ, inferne foramine ovali patentibus. *Lingua* fimbriata, apice emarginata. *Pedes* ambulatorii, mediocres, congrui. *Acrotarsia* aut scutulata, aut supra caligata, infra scutulata. *Acordactyla* scutulata. (*Illiger*.)

Turdus niger, nitore cyaneo saturatissimo.

Arreng-arrengan, of the Javanese.

Turdus cyaneus, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 149.*

THE *Turdus cyaneus* is nearly allied to the *Turdus varius*, which was described in the Second Number of these Researches. Both birds belong to the *Sylvains* of M. Temminck, which constitute the first section of this genus. Like the *Turdus varius*, our bird never descends into the plains, but conceals itself in the forests which cover the mountains and hills, from an elevation of 4000 to 6000 feet above the level of the ocean. It has a more extensive range than the *Turdus varius*, but it is very rarely observed, living retired in the closest forests. During my residence in Java, I obtained only three individuals of this species. Its food consists almost exclusively of berries.

This bird, the *Turdus varius*, and several other species of *Turdus* from the Eastern Islands, have an affinity, which has been pointed out concisely in the

TURDUS CYANEUS.

Catalogue of Birds from Java. In all of them the bill is comparatively long, straight, and abruptly inflected at the extremity. The culmen, or back, is broad, and constitutes a prominent rounded keel. They will probably be found to constitute a natural group among the Silvains.

General colour pure raven-black, with a violet blue lustre diffused throughout the upper parts, and underneath, chiefly over the breast and anterior parts of the abdomen. When exposed to a strong light, the blue tint passes to a saturated azure, which shews itself most strongly on the shoulder and anterior margin of the wings. The feet and bill are intensely black. The plumes of the abdomen and vent are lengthened, having loose silky barbs, which are white at the base, and exhibit marks of this colour when slightly deranged from their natural position.

The proportions of the parts of this bird are the same as those of *Turdus varius*, and it measures in length nine inches and an half.



Drawn by I. Curtis.

Engraved by W. Taylor.

1. TIMALIA PILEATA.

2. TIMALIA GULARIS.

TIMALIA PILEATA.

ORD. II^{me} LES PASSEREAUX, *Cuvier*. 1^{re} Famille. Les Dentirostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 11, Canori.

TIMALIA, Nobis.

CHARACTER ESSENTIALIS.—*Rostrum* validum, compressum, altum. *Maxilla* arcuata, lateribus planis, culmine amplo rotundato levissime emarginato. *Mandibula* robusta. *Nares* subrotundæ in fovea sitæ. *Alæ* breves rotundatæ. *Cauda* elongata gradata. *Pedes* validi. *Unguis* posticus medio antico duplo major.

CHARACTER NATURALIS.—*Rostrum* mediocre, validum, cultratum, valde compressum, altius quam latum. *Maxilla* lateribus planis, a basi ad apicem æqualiter arcuata, levissime emarginata; *culmine* amplo rotundato inter nares alte carinato: tomiis sub inflexis. *Mandibula* gnathidiis validiusculis: tomiis rectis. *Vibrissæ* paucæ, breves, patulæ.

Nares subrotundæ, in fovea laterali sitæ, postice membrana tectæ.

Alæ breves rotundatæ. *Remiges*: prima subspuria, tertia ad quintam longitudine gradatim incrementum, externe leviter emarginatæ, sexta et septima longiores, ceteræ sensim breviores. *Cauda* elongata, gradata; rectrices duodecim, intermediis latioribus.

Pedes mediocres validi: *acrotarsia* scutulata. *Digiti* laterales æquales medio breviores, externus medio ad basin leviter connexus, hallux validior. *Ungues* acuti; medius anticus mediocris, laterales minores æquales; hallucis medio antico duplo major.

AFFINITAS.—Genus nostrum, etsi *Turdo* valde affine, differt tamen rostro alto lateribus planis, culmine amplo vix emarginato, alis brevibus, halluce maximo aliisque notis.

TIMALIA PILEATA.

Timalia subolivaceo-fusca, pileo castaneo, gula juguloque albis nigro lineatis, abdomine sordide testaceo.

Davit, or *Gogo-stile* of the Javanese.

Timalia pileata, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 151.*

IN the generic description above detailed, I have endeavoured to exhibit clearly those characters by which *Timalia* is distinguished from *Turdus*. In a genus so extensive as the latter, a considerable diversity may be expected to exist in the species which belong to it; and in examining and defining the character of *Timalia*, I have not depended on recollection, but have actually placed before me as well those species of *Turdus* which I could obtain, that in affinity come nearest to it, as those that are more obviously distinguished. Of the various species of *Turdus* which I have examined, the *Turdus analis* from Java approaches more nearly to our bird; keeping this species in view, I shall enumerate those characters which are peculiar to *Timalia*. These are a great validity, vertical height, and compression of the bill in general; a smoothness and uniformity of the sides of the upper mandible, which incline gradually to a broad rounded back or culmen, having a very minute notch; further, short rounded wings, robust tarsi, comparatively sharp and hooked claws, which on the posterior toe are double the size of those on the intermediate anterior toe. Our *Timalia pileata* and *Turdus analis* above mentioned, although they resemble each other in habit, and distribution of marks, yet when they are brought together for comparison, exhibit an obvious diversity; and I may add, that on the first discovery of our bird in Java, I considered it to belong to a division different from *Turdus*, and inserted it as such in the notices of my Researches. A bird recently sent from Sumatra by SIR STAMFORD RAFFLES, and belonging to the Museum of the Honourable East India Company, has in some degree confirmed my original conclusions. It strikingly agrees in many characters with our *Timalia pileata*. Its bill has a similar character. It has the same breadth of back, or culmen, the minute notch, the short rounded wings, and the same character of the feet and claws. The sides of the upper mandible are equally smooth and uniform, but it is less elevated. I have described and figured it with the name of *Timalia gularis*; and to afford the means of a careful comparison, I have represented, with all possible accuracy, on the Plate of Illustrations, both the bill of *Timalia pileata* and of *Timalia gularis*.

TIMALIA PILEATA.

A peculiar character is exhibited in both species of *Timalia*, by the structure of the plumes which cover the back and the upper parts of the neck, as well as the breast, belly, vent, and thighs. The separate filaments (*radii*, agreeably to Illiger), which constitute the vanes or webs of these plumes, are not in close contact, as is generally the case, but being inserted into the shaft, at a small distance from each other, they diverge with perfect regularity. The parts which they cover are accordingly marked with delicate parallel lines, and wherever several plumes lie over each other, they form a beautiful reticulation. On the posterior part of the abdomen, the vent, and the thighs, the plumes have a similar structure; but the filaments are greatly elongated and pendulous, so as to envelope these parts with a lax plumose covering, which on near inspection appears covered with delicate hairs. This appearance is produced by a series of very minute parallel villi, on each of the separate filaments, arranged with great regularity and beauty. Plumes, in which this structure can be discerned with the naked eye, are named decompound by Illiger, and described as those whose radii are pinnated with smaller lateral radii; and the effect which the arrangement of these decompound plumes has in the appearance of the bird, is exhibited with accuracy both in the figure of *Timalia pileata* and of *Timalia gularis*. These two species further agree in external character in the lines which mark the throat, and in the darkness of the upper parts of the head, modified, however, in such a manner, as to afford a distinguishing character to each.

Entire length of the *Timalia pileata*, six inches and three-fourths. Body, ovate, rather stout. General colour, above brown, with an olivaceous tint; underneath, testaceous, inclining to gray. Head capped with saturated chesnut. Throat and cheeks white. Breast white, inclining to gray, marked with intensely black stripes by the shafts of the plumes. A narrow white band commences at the forehead, near the base of the bill, passes backward, encircles the eye, and unites with the white plumes of the cheeks. Axillæ, white; which colour also shews itself in a narrow border of the wing. Quills and tail feathers of a more pure brown colour than the other parts: very narrow transverse undulations, of a darker colour, may be observed on the tail feathers by a close examination. Plumes of the hypochondriæ, thighs, and vent, long, pendulous, decompound, and villose. The lesser wing coverts, as well as the plumes which cover the nape and back, are grayish-blue at the base; which colour shews itself on the separate filaments or radii, if the plumes are accidentally deranged. Tail, underneath, brown, with a hoary tint. Bill black and shining. Feet brown.

The *Timalia pileata* is not unfrequent in the groves and small woods which abound in every part of Java. It often approaches the villages and plantations, and

TIMALIA PILEATA.

constructs its nests in the hedges ; it is one of the social birds which delight to dwell in the neighbourhood of cultivation. In large forests I have not observed it. Its flight is low and interrupted. Wherever it resides, it is a welcome neighbour, in consequence of the peculiarity and pleasantness of its note. This consists of a slow repetition of the five tones of the diatonic scale (C D E F G), which it chants with perfect regularity, several times in succession, and at small intervals of time. The sixth tone is sometimes added ; but as this requires apparently an extraordinary effort, it is by no means so agreeable to a musical ear as the simple repetition of five notes, which appears to be the natural compass of the organs of the bird.

TIMALIA GULARIS.

ORD. II^{me} Les PASSEREAUX, *Cuvier*. 1^{re} Famille. Les Dentirostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 11. Canori.

TIMALIA, Nobis.

CHARACTER GENERICUS.—*Vide* Timalia pileata.

Timalia supra fusca remigibus rectricibusque saturatoribus, subtus flavescens lateribus olivaceis, gula pectoreque luteis lineis sagittatis notatis.

Motacilla gularis, *Sir T. S. Raffles's MS. Cat. of a Zool. Coll. made in Sumatra.*

Burung-Puding, of the Inhabitants of Sumatra.

THE entire length of the Timalia gularis is five inches. Upper parts brown, with a rufous tint; inclining to olivaceous on the nape and back; deeper, and saturated on the crown of the head, wings, and tail. Underneath, yellowish; sides of the abdomen bounded by gray, with an olivaceous cast. Throat and breast intensely yellow, marked with black lines, gradually wider at their lower extremity, and having a sagittate form. Eye encircled by a patch of blueish-gray. Bill brown; tip and lower mandible lighter, having a plumbeous hue. Feet brownish-gray. The white colour of the axillæ shews itself in a small spot on the margin of the wing. Plumes of the hypochondriæ, thighs, and vent, long, pendulous, and decompound.

Native of the Island of Sumatra; whence it was sent to the Museum of the Honourable East India Company by SIR T. S. RAFFLES.



IORA SCAPULARIS.

Iora scapularis, Linn.

Iora scapularis, Linn. *Iora scapularis*, Linn.

IÖRA SCAPULARIS.

ORD. II^{de} LES PASSEREAUX, *Cuvier*. 1^{re} Famille, Les Dentirostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 11, Canori.

IÖRA, Nobis.

CHARACTER ESSENTIALIS.—*Rostrum* mediocre, rectum, validiusculum, æqualiter attenuatum, culmine rotundato. *Mandibula* robusta. *Tomia* dilatata, recta, acuta, diaphana, maxillaria emarginata. *Alæ* breves, obtusæ. *Cauda* mediocris, subrotundata.

CHARACTER NATURALIS.—*Rostrum* longitudine caput æquans, rectum, validiusculum, basi latius, æqualiter attenuatum, cuneiforme, culmine rotundato, leviter arcuato, post nares extenso, apice vix inflexo. *Mandibula* gnathidiis robustioribus, gonyde elongato, attenuato. *Tomia* dilatata, recta, acuta, diaphana, maxillaria ad apicem rostri leviter emarginata.

Nares ovatae, parvæ, in fovea elongata antice attenuata sitæ.

Alæ breves, obtusæ. *Remiges*: prima spuria, quarta ad septimam externe tenuiter sinuata; tertia ad octavam longiores, subæquales, secunda abrupte, nona et sequentes gradatim breviores. *Cauda* mediocris, subrotundata.

Pedes mediocres, congrui. *Tarsus* digito medio dimidio longior. *Acropodia* obscura, scutulata. *Digiti* antichi debiles, medio cum externo basi coalito; hallux validiusculus. *Ungues* antichi debiles, postico valido, fortius curvato: infra laminis sæpius ab usu patulis, tenuis fissuris divisis.

AFFINITAS.—Iöra generi *Sylvia* pluribus notis affinitatem præbet, attamen rostro longiore, æqualiter attenuato, maxilla mandibulaque validis, tomiisque dilatatis, rectis, acutis, diaphanis manifeste discrepat.

Iöra olivaceo-viridi-flava, remigibus nigricantibus externe flavido interne albo marginatis, alis maculis albis confluentibus scapulis parallelis notatis, abdomine pectoreque flavis.

IÖRA SCAPULARIS.

Cheetoo, of the Javanese.

Iöra scapularis, *Horsf. Syst. Arrangement of Birds from Java*, Linn. Trans. Vol. XIII. p. 152.

Turdus scapularis, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra*, Linn. Trans. Vol. XIII. p. 311.

Scapular Wagtail, *Gen. Hist. of Birds by John Latham, M. D. Second Edition*, 1823, Vol. VI. p. 336, N. 25.

THE Iöra scapularis has various points of affinity both to the genus *Sylvia* and to *Motacilla*, and it is not easy to determine to which it be most nearly related. According to the views of many Ornithologists, it would be arranged in the former genus. The celebrated Dr. Latham, who first established this genus, has assigned a predominance to those characters which associate it with the Wagtails, and has described it with the name of Scapular Wagtail, in the Sixth Volume of the new Edition of the General History of Birds, which is now in progress of publication. The principles which have guided me in arranging the Systematic Catalogue of Birds from the Island of Java, contained in the XIIIth Volume of the Transactions of the Linnean Society, have not permitted me to associate it either with *Sylvia* or *Motacilla*: I have therefore defined it as a distinct genus, with the name IÖRA. In preparing a more detailed description for the present Number of these Researches, I have again instituted a careful comparison with the genus *Sylvia*, to which, according to my views, it is most nearly related, and I shall now detail the result.

In the first place, it is necessary to remark, that the individuals composing the extensive genus *Sylvia*, have been divided by M. Temminck into six distinct sections, and that the second section has more particularly been kept in view in the following comparison. It appears, then, that the general habit of Iöra, both regarding the form of the body and the proportion of parts, is more compact. The body is short, the neck thick, and the head robust. The bill differs from that of the species of *Sylvia* with which I have compared it, in length, strength, and form: it is, in Iöra, as long as the head, of great strength, and very gradually attenuated. At the base the upper mandible is nearly angular; thence the sides have a very gentle rotundity, and meet in the culmen or back, which is strongly rounded above, and terminated, at the apex, with a very gradual curve. The rotundity of the sides is not distinctly perceived without a close examination; the bill, seen at a small distance, appears to be bounded by an even surface. The lower mandible, in parti-

IÖRA SCAPULARIS.

cular, is comparatively of great strength, and the sharp, erect, transparent, cutting edges, or tomia, afford a striking peculiarity: they are bounded by a straight line, and, in the upper mandible, have a notch at the extremity, which, though small, is very distinct. The bill, at the base, is broader than high, and very gradually and uniformly attenuated, so as to resemble a wedge. In *Sylvia*, on the contrary, the bill is slender, awl-shaped, and the sides are strongly rounded; the edges are bent inward; the lower mandible is small at the base, and the height of the bill exceeds the breadth: it is likewise considerably shorter than the head.

The wings are proportionally shorter in *Iöra* than in the second section of *Sylvia*; the quill feathers, from the fourth, in some instances from the third, to the seventh, are slightly emarginate exteriorly; and the almost equal length of these feathers, from the third to the eighth, renders the wings strictly obtuse. The tail, in proportion to the body, is shorter than in most sections of the genus *Sylvia*, which, however, considerably differ from each other in this point. The tarsi have the same proportional length as in *Sylvia*, but the toes are more robust; the outer toe is united to the middle toe at the base. The claws, although compressed above, present, in the adult specimens, a character which appears to be the consequence of the peculiar habits of our bird: the points are much worn, and have the appearance of being used in scraping the bark of trees; the laminae, or plates which compose them, are often forcibly separated, and marked with slight scaly inequalities and fissures.

In keeping the *Iöra scapularis* distinct from the extensive and multifarious genus *Sylvia*, and in proposing it as the type of a new genus, I gladly avail myself of the recent example of the celebrated M. Temminck, in a similar case. In the 29th Number of the *Planches coloriées*, he has figured two birds from Brazil, exhibiting the type of a new American genus, which he has named *HYLOPHILUS*. This genus resembles *Iöra* in the strength of the bill, in the shortness of the wings, and in the rotundity of the tail; but it has a bill shorter in proportion to the head, more strictly wedge-shaped, tending more suddenly to a sharp point, and, in the figure, no notch is apparent, and the broad transparent cutting edges, which afford a distinguishing character to *Iöra*, are not perceptible. I regret that M. Temminck has not given in the Number which contains the figures, a definition of the characters of this genus; but they are sufficiently evident to illustrate the views according to which he has established this genus.

The entire length of the *Iöra scapularis* is five inches and a half; its weight four drams and one fourth. The general colour of the upper parts is olive green,

IÖRA SCAPULARIS.

inclining to yellow; it is more saturated on the back and neck, and becomes pale and yellowish on the coverts of the tail and forehead. The same colour, but more diluted, covers the abdomen and vent. The throat, breast, and cheeks have a bright lemon yellow tint. A narrow border of this colour also marks the outer margin of the quill and secondary feathers, while the latter have interiorly a whitish margin. Each of the greater coverts of the wing is terminated obliquely by a broad white band, and the disposition of these feathers occasions a single, or in some instances two irregular, nearly parallel, longitudinal lines on the wing. The general colour of the quill and secondary feathers is dark brown, inclining to black. The plumes of the lower part of the back and the abdomen, and hypochondriæ, are greatly lengthened; and their filaments are soft, silky, and much subdivided, so as to constitute a thick coat surrounding these parts like a muff. The under side of the wing is brown at the extremity; a white discoloration extends obliquely backward, occasioned by the white border of the inner vane of the quill feathers. The tail consists of twelve feathers, which are close at the base, and inserted in a double series, above each other; the exterior feathers, and those that are lowest in their insertion, are somewhat shorter, so as to afford a moderate rotundity to the tail. The intermediate feathers are regular, and have an uniform tint of olive, inclining to brown; on the exterior feathers the inner vane is broader: they are somewhat obliquely inserted, and they have exteriorly, and at the extremity, a yellow border; the shafts are deep brown. The irides have a white or pale yellow colour, and the bill and feet are blueish. The nostrils are posteriorly covered by a membrane, and a few short slender bristles, arising from the forehead, stretch over them.

The Iöra scapularis is a bird of social habits, and resorts to the vicinity of human dwellings: indeed it appears to have retired from the forests, and established itself in the trees and hedges which surround the villages and plantations. The structure of its wings does not enable it to take long continued excursions, but it shews itself by short and frequent flights between the trees and branches. It is most lively in the middle of the day, when, under a burning sun, the inhabitants uniformly retire to rest: early in the morning, and towards the approach of night, it is rarely perceived; but during the silence prevailing at noon, it enlivens the villages with the song of *Cheetoo, Cheetoo*, which it repeats at short intervals, during its sportive sallies between the branches. It feeds on small insects, and its economy is in some measure illustrated by the comparative length and sharpness of the bill, and by the broken or splintery state in which the claws are frequently found. The laminae, or plates which compose them, are separated, and the sides are marked with small fissures, which appear to be occasioned by incessant use in scraping the bark of trees.



Collected by

Printed by C. Hollman

ORIOULUS XANTHONOTUS.

London. Pub. by Kingsbury, Parbury, & Allen, Leadenhall Street April 1825.

ORIOIUS XANTHONOTUS.

ORD. II^{de} LES PASSEREAUX, *Cuvier*. 1^{re} Famille, Les Dentiostres.

ORD. II^{de} OMNIVORES, *Temminck*.

ORD. II. PICÆ, *Linn. Syst.* Sect. I. Pedibus ambulatoriis.

ORD. II. AMBULATOIRES, *Illiger*, Fam. 14. Coraces.

ORIOIUS, *Linn. Lath. Temm. &c.*

CORACIAS, *Illiger*.

CHAR. GEN.—*Rostrum* mediocre, validiusculum, cultratum, culmine rotundato, maxilla ad apicem subadunca, emarginata, mandibula apice incisa acuminata. *Vibrissæ* rigidæ patentés, in angulo labiali. *Caput* dense plumatum. *Nares* basales, laterales, nudæ, membrana superne semiclausæ, rima ovali longitudinali inferne apertæ. *Lingua* cartilaginea, lineari-lanceolata, apice fimbriata. *Alæ* longiusculæ, acuminatæ. *Remiges*: prima spuria, secunda subelongata, tertia longissima. *Pedes* ambulatorii, mediocres, congrui. *Acropodia* scutulata.

Oriolus ater, pectore et ventre albidis nigro striatis, dorso uropygio scapulis axillis crisso rectricibusque interne flavis, rostro rubescente, pedibus nigris.

Attat, of the Javanese, in the eastern districts.

Oriolus xanthonotus, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 152.*

Yellow-backed Oriole, *Gen. Hist. of Birds, by John Latham, M. D. Second Edition, 1822, Vol. III. p. 143. N. 61.*

Oriolus maculatus, Le Lorient Grivelé, *Encyclopedie, art. Ornithologie, p. 695, addition, &c. 1822. The Female.*

THE Oriolus Xanthonotus has nothing to distinguish it from the true character of the genus Oriolus in the form of the bill and claws, or of the body. It is somewhat smaller than the Asiatic variety of the Oriolus Galbula of Latham, the Oriolus

ORIOIUS XANTHONOTUS.

Chinensis of Linné, and the Couliavan of Buffon; and, while this is common in most parts of India and the Indian Islands, the *Oriolus xanthonotus* is found solitary in a few circumscribed situations in the Island of Java.

The entire length of our bird is seven inches. In the male, the head and part of the neck, the wings and the tail-feathers, excepting a small portion of the inner vane, are black, with a slight tint of sooty brown. The posterior part of the neck above, the back, rump, vent, scapulars, and the extremity of the inner vanes of the tail-feathers, are bright yellow. Two of the intermediate tail-feathers are also black; on the others the yellow colour constitutes a band, which is narrow on the feathers next the intermediate ones, and gradually increases in breadth, so as on the outer feathers to occupy more than half the vane. A little yellow also shews itself in a narrow margin along the outer vane of the quill-feathers: and the plumes of the shoulders, the axillæ, and the thighs are slightly tinctured with yellow. The lower part of the neck, the breast, and abdomen are white, and marked with longitudinal black lines, which are formed by a regularly defined black streak occupying the middle of each plume, in the direction of the shaft. The bill is red or reddish brown, the irides are yellow, and the feet dark blue inclining to black.

In the female, those parts which are black in the male, have a grayish-brown tint, inclining to yellow; the quill and tail feathers are brown, and the latter have the extreme portion of the inner vane yellow, and defined as in the male. The rump only has a bright yellow colour; the back and adjoining parts are pale, and partake of the grayish-brown tint of the upper parts. The head and neck have the general tint of the wings, but not separated from the yellow plumes of the back by a defined line, as in the male. The throat and the neck underneath are whitish, and variegated with gray; the breast and abdomen are likewise marked with regular black lines. In the addition to the Article Ornithology, of the *Encyclopedie*, which is now published in Paris, the female of our bird is described as *Le Lorient Grivelé*—*Oriolus maculatus*—with the following character:—*Oriolus dilute flavus: gula pectoreque maculatis; rostro fusco, remigibus rectricibusque nigricante fuscis, his apice flavis.* The specimen was from the Island of Java, and the author proposes the query, whether it be not the female of an unknown species?

I found this bird in Blitar, in a district covered with extensive forests: as far as I have observed, it never quits the closest shades. Two males only, and one female, are contained in the Museum at the India House.



IRENA PUELLA. MALE

Printed by L. W. and J.

Illustrated by Edward Kingdon, Parbury, 8' Allen, 7' Leadenhall St. July 2, 1881.

A. P. and J.

IRENA PUELLA,

Male and Female.

ORD. II^{de} LES PASSEREAUX, *Cuvier*. 1^{re} Famille, Les Dentiostres.

ORD. II^{de} OMNIVORES, *Temminck*.

ORD. II. PICÆ, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*.

IRENA, Nob.

CHAR. GEN. *Rostrum* mediocre, cultratum; maxilla apice adunca emarginata. *Culmen* arcuatum, elevatum, inter nares carinatum, utrinque a basi ultra medium usque sulco obsoleto exaratum, lateribus subconvexis. *Nares* basales subrotundæ, vibrissis rigidis plumisque velutinis obtectæ. *Alæ* cauda breviores. *Remiges*: 2—6 externe emarginatæ, 3—6 longiores subæquales; secunda sequente abrupte brevior, prima subspuria. *Cauda* mediocris, truncata. *Tarsi* digitique breves. *Acropodia* scutulata. *Ungues* parvi, fortius curvati, debiles.

AFFINITAS. Oriolo, Turdo, Pastori genere affinis, differt tamen convexitate laterali rostri, tegmine velutino narium, brevitate tarsorum et debilitate unguium.

Irena atra, corpore colloque supra cervice tectricibusque alarum primis, caudæque superioribus et inferioribus cyaneis, nitore saturato azureo.

Bressi, of the Javanese.

Biang-kapoor, of the Malays of Sumatra.

Coracias puella, *Lath. Ind. Orn.* 171.

Fairy Roller, *Lath. Syn. Supp.* p. 87. 21.

Irena puella, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans.* Vol. XIII. p. 153.

THIS bird is not confined to Java, but is also found in Sumatra and the adjacent Islands. In enumerating it among the birds of Sumatra, Sir Stamford Raffles remarks—"Nothing can surpass the richness of the colours which distinguish the "male of this species; they far exceed what any painting can convey." The crown of the head, the neck above, the back, lesser wing coverts, and the coverts of the tail, both above and beneath, are of a most resplendent smalt blue, while every other part is of the finest velvet black.

IRENA PUELLA.

The total length is from $8\frac{1}{2}$ to $9\frac{1}{2}$ inches. The bill measures from the gape to the tip, one inch and half a line. The form of the body is oval; the neck thick, and the wings pass but a small distance beyond the root of the tail. The tarsi are remarkably short, and the toes and claws weak. The bill and feet are black. In some individuals, two or three of the greater coverts, nearest the back, have an extreme band of blue, which appears in several spots on the wing; but these are neither constant, nor uniform in size, and in general they exist on one side only. Beyond the neck the blue colour of the upper part of the back spreads considerably, and unites with the blue of the lesser coverts of the wings, so that the black and blue of the sides of the neck meet in an irregularly defined line.

The FEMALE is of the same size with the Male, and agrees with it accurately in the proportion and form of the bill and tarsi. The predominant colour is a dull blue, slightly inclining to olive, and which, when exposed to a strong light, exhibits an obscure reflection of sea-green. The plumes of the head, neck, and upper parts of the body are blackish brown at the base, and this colour shews itself on these parts, in very delicate transverse undulations. The quill-feathers are entirely brown, with darker shafts inclining to black: the greater coverts of the wing, and the secondary quill-feathers are brown, but have exteriorly a border of the general dull blue colour. On the rump and coverts of the tail, as well as on the upper side of the tail-feathers, the reflection of the sea-green colour shews itself strongly when these parts are turned to the light. The tail and wings beneath are brown.

The *Irena puella* inhabits woods and forests, feeding on fruits and wild grains. In Java it is a very rare bird, and confined to a few districts, where it conceals itself on solitary hills, distant from the habitations of man, preferring rather elevated and cool situations. I met with it only in the western parts of the Island; once in the Province of Banyu-mas, and a second time on the ridges of hills situated southwest from Buitenzorg.

A drawing, in the possession of Lady Impey, afforded to Dr. Latham the materials for the description contained in the Supplement to his Synopsis, p. 87. 21. It is here arranged among the Rollers; but it may be presumed that the characters were not accurately represented in the drawing. In the "Zoological Catalogue," Sir Stamford Raffles remarks, "adverting to the form of the bill, compressed, carinated, "and notched, it seems doubtful whether this bird be truly a species of Coracias." The result of my comparisons has been to place it in the family of Cornirostres of the celebrated Cuvier, and to arrange it as a distinct genus in that group which comprises *Turdus*, *Pastor*, *Oriolus*, and *Myiothera*; and which is allied on one side to *Edolius*, and on the other to *Philedon*. It has been my endeavour in the generic



as before.

Prepared by C. S. Hart.

IRENA PUELLA, FEMALE.

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IRENA PUELLA.

description, to exhibit clearly the distinctive characters, consisting in the lateral convexity, the strongly arched culmen, and the terminal notch of the bill; in the velvet-like covering of the nares, from which strong vibrissæ are protruded; in the shortness of the legs and toes, and in the weakness of the claws: and it may not be improper to add in this place, a concise comparative view of the characters by which this genus is distinguished from the individuals of the group above mentioned.

Oriolus resembles *Irena* in the proportional length of the bill, and in the carinated culmen or back; but it has this organ less considerably arched, with a smaller terminal notch, and a shorter hook at the tip; the sides are also less convex, and the nostrils completely naked. The tarsi in *Oriolus* are longer in proportion to the size of the body, and more robust. *Pastor* has a bill less elevated and arched than *Irena*, shorter in regard to the head, rounded above with a very slight terminal notch, and a large oblong groove for the nostrils: the plumes covering these, posteriorly and above, are not soft and delicate, so as to resemble velvet, but they differ in size only from the plumes of the forehead; the legs are stout, and the claws vigorous and strongly curved, indicating different habits, and a different mode of life. *Myiothera* of *Illiger* (with which in this comparison I also connect *Pitta* of *Vieillot*) differs in having slender and elevated tarsi, and a claw proportionally strong and robust to the hind toe: its bill is also more straight, cylindrical, horny, and thick, tapering very gradually to an obtuse very slightly notched point. *Turdus* has naked nostrils, and in comparison with *Irena*, a slender somewhat compressed bill, with an obtusely carinated back, blunt point, and small terminal notch: it has likewise elevated tarsi and robust claws.

A reference to the Plate of Illustrations will elucidate this comparison so far as regards the characters of *Irena* and *Oriolus*. In letter *K* the bill of *Irena* is represented in profile (*a*), and seen from above (*b*): the letter (*a*) exhibits faithfully the curvature of the bill, the terminal notch and hook, the covering of the nares, and the slight lateral groove.

Letter *L* exhibits two views of the bill of the oriental variety of the *Oriolus* *Galbula*: in this genus the nares are naked, the arch of the bill is less considerable than in *Irena*, and the terminal notch is small: but the best illustration of my views is the comparison of the figures *K* and *L*.

In Letter *M* two views of the bill of *Coracias garrula* are given, carefully taken from a very perfect specimen in the British Museum: it requires no further demonstration to shew that our bird cannot be arranged in the genus *Coracias*, of which this species is the type.



Phaethon rubricauda

NOTA CULJ, A P P B, C I P P A,

London. Engraved by B. & C. King, 1822. July 2, 1822.

MOTACILLA SPECIOSA.

ORD. II^{de} LES PASSEREAUX, *Cuvier*. 1^{me} Famille, Les Dentirostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*.

MOTACILLA, *Latham*, *Temminck*.

CHAR. GEN. *Rostrum* mediocre, rectum, cylindricum, gracile, subulatum, emarginatum. *Maxilla* basi subtrigona, culmine inter nares carinato; *mandibula* subcompressa. *Nares* basales, laterales, ovaes, membrana nuda semiclausæ. *Cauda* elongata æqualis seu forficata. *Pedes* ambulatorii: *tarsi* elongati, digito medio duplo fere longiores. *Ungues* parvi, hallucis medio antice majore.

Motacilla atra, pileo cristato ventre uropygio fascia alarum rectricibus extimis totis, ceteris apicibus niveis, cauda longissima forficata.

Chenging or *Kingking* of the Javanese.

Motacilla speciosa, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 155.*

THE plumes of black and white which ornament this bird, are so disposed as to form a strong and beautiful contrast. The crest, lower part of the back, the rump, belly, vent, the two exterior tail feathers entirely, and the other tail feathers at their extremity, a broad band extending obliquely across the wings and the axillæ are white; the head (excepting the crest), the breast, back, and greatest part of the wings and tail are black. The white resembles the purest snow white, but the black has different shades: it is more intense on the head and breast, having a slight reflection of dark blue inclining to purple; on the extremity of the wings it has a tint of brown. A few minute black plumes bound the crest behind and at the sides, extending to the base of the bill. Three or four of the last secondary feathers have a narrow band of white; but the succession is not regular: it sometimes appears on the alternate feathers, or on the fourth after two intermediate feathers of the usual blackish-brown colour. The plumes of the Hypochondriæ are elongated, and delicately villous. The length of the body and head is $4\frac{1}{2}$, and of the tail 6 inches: the bill is black, and measures 10 lines in length; the tarsi have nearly double the length of the middle toe, and are pale flesh-coloured, with a tint of yellow.

MOTACILLA SPECIOSA.

The *Motacilla speciosa* resembles in its habits and manners several European species of this genus. It is exclusively found near small rivulets: in the beds of these, particularly where they abound with rocks and gravel, it is seen running along with alacrity, moving its tail incessantly, and picking up worms and insects. It is very locally distributed, and uniformly deserts the neighbourhood of populous villages. It is almost entirely confined to the southern coast of Java, which abounds in small streams, descending rapidly from the southern hills, and shaded by luxuriant shrubs. Here I first discovered this bird, in the district of Pajittan, in the year 1809. I afterwards met with it again, along this coast, in the district of Karang-bollong, and in the provinces south of Kediri. Among more central situations, it frequents the banks of an elevated lake near the declivities of the Mountain Prahū, where I found it more numerous than in any other part of Java. In the extensive forests of Pugar and Blambangan I never noticed it, although I devoted a considerable time to their examination.

In comparing *Motacilla speciosa* with *Motacilla flava*, which is also found in Java, it may be remarked that its bill is proportionally long, broad at the base, then suddenly compressed, or tapering almost equally to a point, which is abruptly curved. It has also a more rounded back, the terminal notch is more obvious, and the point proportionally obtuse. The groove containing the nares is depressed, and the membrane covering the superior portion, large and prominent. The claw of the posterior toe of *Motacilla flava* is slender and elongated: in *Motacilla speciosa* it agrees with the character given of it in the generic description. But the remiges of our species have an arrangement different from those of the European *Motacillæ*: in these the second is longest, and the first scarcely perceptible. In the *Motacilla speciosa* the first is short; from the second, which is of moderate length, they increase gradually to the fifth, which is longest: the sixth and seventh are gradually, and the remaining abruptly abbreviated.



Fig. 1.

Fig. 2.

BRACHYPTERYX MONTANA.

1. Male. 2. Female.

From a specimen in the collection of the British Museum.

BRACHYPTERYX MONTANA.

ORD. II^{de} LES PASSEREAUX, *Cuvier*. 1^{re} Famille, Les Dentiostres.

ORD. III^{me} INSECTIVORES, *Temminck*.

ORD. VI. PASSERES, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 11, Canori.

BRACHYPTERYX, *Nobis*.

CHARACTER ESSENTIALIS.—Rostrum culmine inter nares carinato lateribus planis apicem versus rotundato lateribus convexis, tomis subinflexis. *Alæ* brevissimæ, obtusæ. *Cauda* mediocris, rotundata. *Pedes* elongati, debiles; tarsi graciles, digiti gracillimi unguibus compressissimis hallucis majore.

CHARACTER NATURALIS.—*Rostrum* mediocre, validiusculum, subcultratum, basi latius quam altum, ultra medium subconicum, attenuatum: culmen inter nares carinatum, angulatum, lateribus planis, deinde subincrassatum, rotundatum, lateribus convexis, apicem versus arcuatum, emarginatum. *Mandibula* basi depressa, lateribus erectis apicem versus intortis, myxa validiuscula apice subinclinata. *Tomia* maxillæ mandibulæque subinflexa.

Nares maximæ, in fovea subrotunda basali elongata obtusa sitæ, supra et postice membrana clausæ.

Alæ brevissimæ, obtusæ. *Remiges* integræ, prima subspuria, secunda ad quintam gradatim incrementales, quinta ad decimam subæquales longiores, reliquæ gradatim breviores. *Cauda* mediocris, rotundata, rectricibus duodecim.

Pedes elongati, debiles. *Tarsi* graciles digito medio duplo longiores. *Digiti* compressi gracillimi, medio longissimo, lateralibus subæqualibus, externo medio basi subcoalito. *Ungues* compressissimi, acutissimi, hallucis medio duplo majore fortius arcuato.

AFFINITAS.—Proximam Saxicolæ affinitatem genus exhibet, cui rostri forma pedibusque elongatis convenit, sed alis brevibus obtusis et tarsis gracilioribus plane differt.

BRACHYPTERYX MONTANA.

Brachypteryx nigricante-cærulea nitore cano, subtus pallidior, abdomine albido, supra oculos macula alba, dorso alis supra cauda basi hypochondriis tibiisque (mari) badiis.

Ketek, of the Javanese.

Brachypteryx montana, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 158.*

Mountaineer Warbler, *Gen. Hist. of Birds by John Latham, M. D. Second Edition, 1823, Vol. VII. p. 124, N. 138.*

IT was remarked, in discussing the natural situation and affinities of the *Iōra scapularis*, in the last Number of this Work, that in comparing this bird with Dr. Latham's *Sylvia*, the second Section, established by M. Temminck in that extensive genus, had more particularly been kept in view. The *Brachypteryx montana* has again led me to this numerous assemblage of birds; and I have, with equal solicitude, extended my comparisons to all the sections. I shall therefore premise, to the description of our bird, a concise view of the *Sylvia*. Several of the more ancient Ornithologists have exceeded the moderns, if not in the correctness, at least in the number of their subdivisions. Of these M. Brisson deserves the first notice. His XLth genus, *Ficedula*, comprises almost all the European, and many of the foreign birds which are arranged in the genus *Sylvia* of Latham, in the following subdivisions: *Curruca*, *Luscinia*, *Ruticilla*, *Phænicurus*, *Cyanecula*, *Rubecula*, *Regulus*, *Rubetra*, *Vitiflora*, *Motacilla*, *Asilus*, *Sylvia*, and *Ficedula*. In the last Section, comprising several foreign birds, the *Iōra scapularis* (of Number VI. of these Researches) is enumerated with the name of *Ficedula bengalensis*, and a figure in Edwards is referred to. The latter, although it affords a good representation of the colours of our bird, does not exhibit the character of the bill, which constitutes its remarkable peculiarity, with sufficient distinctness. As this was not indicated in the description of the *Iōra scapularis*, I here subjoin a note, explaining the omission of the synonyms of several authors.* The different denominations by which it is designated by these, shew clearly that it possesses some peculiarity

* *Iōra scapularis*.—*Ficedula bengalensis*, Briss. Ornith. III. p. 484, N. 47. *Motacilla Tiphia*, Linn. Syst. Ed. XII. 1, p. 331, N. 13. *Green Indian Fly-catcher*, Edw. Birds, I. t. 79. This bird has many characters in common with the *Motacilla singalensis* and *M. zeylonica*, which are introduced by Gmelin in the XIIIth Edition of the *Systema Naturæ*, from the 15th and 32d Plates of Brown's Illustrations of Zoology. In the most extensive catalogue of birds that has yet appeared in this country, the *Motacilla Tiphia*, Linn., and the *M. zeylonica*, Gmel., (the Ceylon Black Cap of Brown), are considered as the same bird; the specific character of Dr. Latham, therefore, excluding the *Iōra scapularis*, my attention was not directed to the Synonyms.

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which was not rendered apparent in the figure of Edwards, and confirms the views which were given of the character of the genus, although, as a species of *Sylvia*, it was not noticed.

Next to that of Brisson, the arrangement of Bechstein, as far as it regards the genus *Sylvia*, should be considered. He has established four sections, which he denominates families: *viz.* I. *CURRUCÆ*, *Grasmuecken*, comprising many of the Fauvettes-Currucae of Bressiou. II. *ASILUS*, comprising the Pouillot-Asilus of Brisson, the Hippolais, and several other species. III. *FICEDULA*, *Eigentliche Saenger*, comprising several of Brisson's subdivisions, particularly *Phænicurus*, *Rubecula*, and *Trochilus*; and IV. *SAXICOLA*, *Steinmaetzer*, comprising Moteux—*Vitiflora*—of Brisson. M. Cuvier, in placing as his *Grand-genre*, *MOTACILLA* of Linnæus, has, in his subgenera, followed in part the divisions of Bechstein. *Saxicola*, *Ficedula*, *Curruca*, and *Accentor* are cited agreeably to this naturalist; but *Regulus*, *Troglodytes*, *Motacilla* in a limited sense, comprising only the *Lavendières* and *Hochequeues*, are employed according to his own views. M. Temminck has divided the genus *Sylvia* of Latham into five sections:—*Riverains*, *Sylvains*, *Muscivores*, *Roitelets*, and *Troglodytes*, which however do not include *Saxicola*; this he introduces as a distinct genus. Here it must be apparent, that both Cuvier and Bechstein have placed *Saxicola* at the extremity of the subdivisions which they individually establish, affording thus an indication of its deviating from the more regular forms of the genus. *Brachypteryx* deviates still further than *Saxicola* from *Motacilla* or *Sylvia*, as respectively employed by Cuvier and Bechstein; and a concise comparative view will shew the necessity of separating *Brachypteryx* and *Saxicola*, in a natural arrangement. As far as regards the form of the bill, the difference is not considerable: in *Saxicola* *Œnanthe* this organ is comparatively slender; in *Brachypteryx montana* it is, upon the whole, larger in its vertical dimensions, more robust, and more strongly notched; the convexity of the sides of the upper mandible is also more apparent. The tarsi, which are proportionally of great length in *Saxicola* *Œnanthe*, are still longer, and considerably more slender in *Brachypteryx montana*. In the great narrowness of the toes and claws, both genera agree. But the chief distinguishing character of our bird, and that which is strictly peculiar, is the shortness and abrupt termination of the wings; from this its name is properly derived. In *Saxicola* *Œnanthe* the wings are acute, and reach to the middle of the tail: the remiges increase abruptly to the third and fourth, which are longest. In *Brachypteryx* a very gradual elongation takes place to the fifth quill feather; and the following, to the tenth, are very nearly of equal length. The wings are thus short and obtuse, scarcely extending beyond the abdomen, and only touching the

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base of the tail. This latter organ reaches to the extremity of the tarsi; it consists of twelve feathers; the exterior ones extend to the middle of the tail; the remaining gradually increase to the fifth and sixth, which are of equal length.

From these statements it appears, that in the form of the bill, *Brachypteryx* and *Saxicola* very nearly agree; that in comparison with other birds of this family, the tarsi are more slender in *Brachypteryx*; but that the chief distinguishing character of the latter consists in the shortness and obtuseness of the wings.

In our Plate the colours of the male and female bird are carefully exhibited. The weight of the former is five, and of the latter six drams. In the length of the two sexes scarcely any difference is perceptible. The measure is five inches and nine lines from the tip of the bill to the end of the tail: to the extremity of the claws the length is six inches. In the male, the head, neck, and breast have a dark indigo blue tint, inclining to black, with a grayish reflection on the surface, variegated with lighter and darker shades; on the throat and the lower part of the neck, this colour passes into gray; on the forehead it is more intense, inclining to black. Above the eyes is an oblong white spot. The back, the wings above, the shoulders, the coverts of the tail, the vent, hypochondriæ, and thighs, are deep chestnut brown, with a ferruginous reflection. The wings underneath, and the tail at the extremity and underneath, are pure blackish brown; the shafts of the quill and tail feathers are black and shining. The inner vanes of the quills, and the tail feathers generally, have a very deep brown colour. The exterior vanes of the tail feathers are slightly tinted with the ferruginous lustre of the upper parts. The lower parts of the breast and the abdomen are whitish. The plumes, on the posterior portion of the body of our bird, are very thickly disposed; the vanes consist of long, delicate, silky, pendulous laminæ or filaments, forming a lax covering about the lower parts of the abdomen, the hypochondriæ, and the root of the tail. The irides have a dark hue. The bill is black, and the tarsi are deep brown. The tint of the claws is somewhat lighter.

In the female, the dark blue tint, which in the male covers the head and neck, extends over the body generally, and also marks the exterior vanes of the quills. The interior vanes of the latter, and the tail feathers, are dark brown, inclining to black. The throat and neck underneath have a dark grayish tint. The abdomen is grayish white. Over the eyes it has, like the male, a white spot, and the bill and tarsi also agree with that. The covering of the abdomen, vent, and thighs is likewise long, delicate, silky, and pendulous.

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I met with the *Brachypteryx montana* in one situation only, at an elevation of about 7000 feet above the level of the ocean. Like other animals already mentioned in this Work, it is probably found on all the mountain peaks of Java, which are covered with thick forests, accommodated to its peculiar habits. The recurrence of several quadrupeds and birds, at a certain elevation, is as regular in this Island as that of many plants and insects. Although local in its residence, our bird is very numerous on Mount Prahu; and in my daily excursions I uniformly observed, and occasionally surprised it in its short sallies among the openings of the forest. It is chiefly found on the lowest branches of trees, or on the earth. The shortness of its wings incapacitates it for elevated or distant flights, and its motions are low, short, and made with great exertion. It lives in the thickest coverts: here it forms its nest on the ground, and feeds on the larvæ of insects, worms, &c.

Our bird is a delightful resident in the forests of Mount Prahu, which, in the luxuriance of its vegetation and gloomy thickets, is probably not surpassed in any portion of the globe. It utters, almost without interruption, a varied song. Its common note is a quickly reiterated babbling, resembling that of the *Curruca garrula* of Brisson, and other birds of this family; it also has a protracted plaintive note, but it sometimes rises to higher and melodious warblings, which, in the general silence of these elevated regions, afford an inexpressible sensation of delight to the mind of the solitary traveller.



A. P. S. P.

PHAINOPEPLA 'TENIA.

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PHRENOTRIX TEMIA.

ORD. II^{de} LES PASSEREAUX, *Cuvier*. 3^{me} Famille. Les Cornirostres, Div.
Les Corbeaux.

ORD. II^{de} OMNIVORES, *Temminck*.

ORD. II. PICÆ, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 14, Coraces.

PHRENOTRIX, Nob.

CHAR. GEN.—*Rostrum* mediocre, validum, altum, cultratum, basi crassiusculum. *Maxilla* arcuata, lateribus subconvexis, lævibus, sensim in culmen conniventibus. *Capistrum* latum, plumulis holosericis densis. *Nares* capistro reconditæ, circulares, parvæ, in medio sulci transversalis ad basin rostri dispositæ. *Alæ* rotundatæ: remigibus integris 3 et 4 longioribus. *Cauda* corpore longior, cuneata, rectricibus 10 in paribus dispositis. *Pedes* congrui: *digiti* mediocres, exteriore medio ad basin levissime coalito. *Acropodia* scutulata. *Ungues* compressi: hallucis medio vix major.

AFFINITAS.—Genus nostrum etsi *Paradisæ* et *Corvo* affine, characteres satis distinctos habet.

Phrenotrix fuliginosa nitore viride-olivaceo fuscescente, capistro atro.

Chekitut or *Benteot* of the Javanese.

Temia, *Le Vaillant Afr.* 56.

Corvus varians, *Lath. Suppl.*

Phrenotrix Temia, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XII. p. 162.*

THIS bird has a long and slender form; the body is proportionally small, and the tail large, and capable of great expansion. The feet are robust, the wings short, and the bill thick and powerful. The claws are comparatively large, strong, sharp, and much curved. The length of the body and head is five, and of the tail seven inches. The bill measures eleven lines from the gape to the point. The tail is cuneate, and consists of ten feathers, disposed in five pairs, gradually increasing in size; the two middle feathers are uncommonly broad, and rounded at the extremity, affording a peculiar appearance to this bird, in which it differs from its affinities.

PHRENOTRIX TEMIA.

The general colour of the Phrenotrix is sooty black, with a rich and very beautiful lustre of deep olive green, varying according to the degree of light to which it is exposed. The bill and feet are intensely black; the extremity of the wings and the tail underneath, have the general sooty ground colour; the reflection of olive green shews itself but slightly on the outer webs of the upper surface of the tail feathers; it is strongest on the body, scapulars, and back, where in some individuals it approaches to a metallic lustre. It varies likewise according to the age of the bird, and the more perfect condition of its plumage.

A peculiar character of this bird is a border consisting of the most delicate and minute plumes, purely and intensely black, without the least reflection, resembling velvet in a certain aspect, which surrounds the upper mandible, and extending to the eyes, encircles them, and passes narrower around the base of the lower mandible. In this border Phrenotrix agrees with *Paradisea*; but the form of its bill and its other characters shew a nearer relation to *Corvus Pica* and *Corvus senegalensis*. The plumage of the body is thickly disposed, the webs of the separate plumes are fringed and elongated, terminating in a long, silky, delicate down, extremely soft and pleasant to the touch. This peculiarity is faithfully noticed by M. Le Vaillant, who deserves the credit of having first described the Phrenotrix from the collection of Mr. Temminck in Amsterdam. It has appeared to me that the subject described by this celebrated ornithologist agrees specifically with our's, although it is represented, both in the drawing and description, with the four middle tail feathers equal, and less expanded, and with a brownish colour, having a purple reflection.

The Phrenotrix, although not a rare bird in Java, is by no means familiar, and never approaches the villages and habitations like many others. It can only be observed near solitary hamlets situated in tracts recently cleared for cultivation, where its food is abundantly supplied by the insects contained in the rich mould, and by the wild fruit trees about the skirts. In consequence of the shortness of the wings, its motions are slow: it is chiefly seen about noon sailing heavily through the air, in a right line towards the trees surrounding the openings in the forest. The strength of the bill and of the claws shews its adaptation to feed both on fruits and insects.

It remains for me to give the reasons for separating Phrenotrix from the genus *Corvus*. Among the species of this genus which I have been able to obtain for comparison, Phrenotrix is most nearly allied to *Corvus senegalensis* and to *Corvus Pica*. The latter M. Cuvier has arranged as a *Sous-genre* of *Corvus*, while M. Temminck has placed it in the second section of that genus. I have endeavoured, in order to

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explain the considerations by which I have been guided, to represent in the Plate of Illustrations, a comparative view of the bill of Phrenotrix in letter *N. a. & b.*; of Corvus Pica in letter *O. a. & b.*; and of Corvus senegalensis in letter *P.* Phrenotrix is distinguished by an elevated, regular, and smooth bill, gradually tapering to a rounded keel, equally arched from the base to the point, and by a thick velvet-like border which surrounds the bill and orbits: the nostrils also have a very peculiar form and disposition. The Senegal crow has a similar disposition of the nostrils; but the bill, although smooth, regular, and arched, is more lengthened, and the culmen comparatively sharp. No traces of the velvet-like border exist, but the base of the bill is entirely without that peculiar character which is observed in Corvus Pica. Here it is covered by numerous, very stiff, decumbent, jagged bristles, pointing directly forward far beyond the nostrils; the latter are perfectly circular in a gradually narrowed depression. The form of the bill is lengthened, the arch less prominent, and it has a distinct terminal notch, which in Phrenotrix and in Corvus senegalensis is very obsolete.



POMATORHINUS MONTANUS.

Engraved by W. Taylor.

Drawn by J. Curtis.

London, Published by Kingsbury Parbury & Allen, 1, Adelphi Wall, Strand, Decr. 1822.

POMATORHINUS MONTANUS.



ORD. II^{me} LES PASSÉREAUX, *Cuvier*. 4^{me} Famille, Les Ténuirostrés.

ORD. VI^{me} ANISODACTYLES, *Temminck*.

ORD. II. PICÆ, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 8. Tenuirostrés.

POMATORHINUS, Nobis.

CHARACTER ESSENTIALIS. *Rostrum* validiusculum, integrum, ultra nares abruptius compressum. *Nares* operculo corneo, convexo tectæ. *Alæ* rotundatæ. *Cauda* elongata. *Unguis* hallucis validior.

CHARACTER NATURALIS. *Rostrum* mediocre, gracile, acutum, validiusculum, basi rectum, altius quam latum, ultra nares modice incurvum et abruptius compressum. *Maxilla* culmine elevato, carinato, rotundato; tomis rectis verticalibus, mandibulæ oppositis, acutis, subdiaphanis. *Mandibula* gonyde æqualiter attenuato, tomis rectis maxillæ oppositis, diaphanis.

Nares operculo corneo, oblongo, convexo, obtectæ, margine juxta capistrum inflexo, apertura oblique postice spectante.

Alæ mediocres subrotundatæ. *Remiges*: prima et secunda abrupte, tertia et quarta gradatim increscentes, quinta, sexta, et septima longiores, subæquales, reliqui gradatim decrescentes, tertia ad septimam tenuiter emarginatæ. *Cauda* rotundata elongata.

Pedes subelongati. *Digitus* medius longior, cum exteriore basi levitur connexus; hallux robustior. *Ungues* compressi, arcuati, mediocres, hallucis validior. *Acropodia* scutulata; *acrotarsia* obscurior.

AFFINITAS. Genus nostrum rostro valido ante nares abrupte compresso et operculo corneo nares obtegente, characteres distinctos habet, etsi rostro gracili, arcuato et integerrimo, aliisque notis, *Cinnyri* valde affine sit.



Pomatorhinus castaneus, capite cinerescente-nigro, striga oculari de rostri basi supra oculos ad nucham extensa gula pectoreque albis.

POMATORHINUS MONTANUS.

Bokkrek, of the Javanese.

Pomatorhinus montanus, *Horsf. Syst. Arrangement of Birds from Java*, Linn.
Trans. Vol. XIII. p. 165.

TO the concise remarks on the affinity of *Pomatorhinus*, which have been annexed to the generic character, it is necessary to add a few details regarding the comparisons which I have instituted, in order to ascertain, as far as possible, the relations of this genus, and its place in the natural system. Although it has been placed among the slender-billed birds, the *Tenuirostres* of M. Cuvier, it possesses various characters by which it is related to the *Dentirostres* of the same author. The most obvious of these are, a great validity of the bill and tarsi comparatively with other birds of the family of *Tenuirostres*. In reviewing the *Dentirostres* for this comparison, one genus prominently presented itself, which possesses various points of analogy to the slender-billed birds. These shew themselves in the structure of the bill and feet, in the manners, and in the food. Deriving the latter from sweet substances, which it extracts from flowers and other parts of vegetables, it has been named *Melliphaga* by Lewin, who first observed and described it in its native country, and *Phiedon* by Cuvier. And from the more accurate examination of later ornithologists, it appears that various birds, which have been placed in the genus *Certhia* of Linnæus, which comprised a large proportion of the slender-billed birds, belong to the genus *Melliphaga*: for instance—*Certhia carunculata*, *Certhia cardinalis*, *Certhia atricapilla*, and many others. It may be observed, however, that the genus *Melliphaga* is, even at the present period, not defined with critical accuracy, and that birds of very different structure and habits are promiscuously arranged in it. The most prominent characters of *Melliphaga* are an arched bill, moderately compressed at the sides, rising in the middle to an elevated culmen or back, a lower mandible, nearly straight, and a covering to the posterior portion of the nares. In the feet, the two exterior toes are slightly connected at the base, and the claw of the hind toe is comparatively stout. These characters are also observed in *Pomatorhinus*; a more minute detail of the peculiarities of *Melliphaga* is therefore required to shew those points in which these two genera are different. In *Melliphaga* the extremity of the upper mandible is decidedly and uniformly notched; the nares extend, in form of a longitudinal groove, from the base towards the middle of the bill; their covering is partial and membranaceous; they are pervious, or pass into each other from the opposite sides; the edges of the upper mandible are slightly bent inward, while the apex is laterally rounded and distended.

POMATORHINUS MONTANUS.

Pomatorhinus has no analogy to any other genus of the family of *Dentirostres*. Although the bill has a small degree of validity, it possesses the essential character of the *Tenuirostres*, as defined by M. Cuvier. It is long, slender, arched, and entire. Agreeably to the comparisons which I have been able to institute, it is most nearly related to that division of the genus *Cinnyris*, as employed by M. Cuvier, the individuals of which have bills of moderate length. In order to afford the means of comparison, the bill of *Pomatorhinus* has been accurately represented in the Plate of Illustrations, and I proceed to detail the distinguishing characters in reference to this. The bill is abruptly compressed immediately before the nares, and rises to an elevated rounded culmen or back; the sides are even and vertical; both mandibles are nearly of equal breadth, and the tomia, or cutting edges, are directly opposed to each other: this character is of importance, as, together with the validity of the bill, it affords a clear distinction from *Cinnyris*, in which the edges of the mandibles are inflected, and the lower mandible is partially received into the upper. The covering of the nares, although it generally resembles that which exists in *Cinnyris*, is larger and more developed, constituting an arched operculum of an oval form and horny texture, which projects horizontally, and nearly conceals the anterior portion of the nasal aperture, while its outer margin is slightly inflected, and resembles the border of a very minute shell. The aperture itself is directed obliquely towards the forehead.

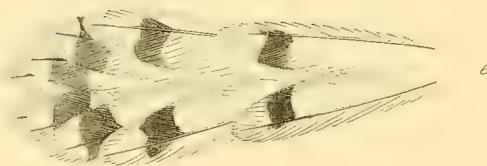
As far as regards the affinity of *Pomatorhinus*, much research is still necessary for determining it. The materials which I have been enabled to consult, have exhibited chiefly its relations to *Cinnyris*; these appear from the preceding details. But its relations to the other genera of this family, and its connexions in a natural series, have not been ascertained satisfactorily. In the systematic catalogue, which contains a concise description of the birds which I collected in Java, the relations of *Pomatorhinus* to *Prinia* were pointed out as they exhibit themselves in the validity of the bill, its sudden compression before the nares, and the entireness of the cutting edges. But an interruption in a natural series still remains, between *Prinia* and *Pomatorhinus*.

In *Pomatorhinus montanus*, the upper parts of the body, wings, and tail, as well as the posterior portion of the neck, are brown; but this colour differs in its shades and degrees of intensity on different parts. It is chestnut, with a reddish hue, on the neck, back, and scapulars, while it becomes gradually obscure, and assumes an olivaceous tint, on the upper parts of the tail and wings. The colour of these parts underneath, as well as the extremity of the quill-feathers, is dark brown, inclining to black; but the vivid chestnut tint of the neck and back is diffused over the lateral parts of the breast and abdomen. The head above and at the sides, and

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the anterior parts of the neck, are black, with an obscure tint of gray. The throat, the breast, a narrow streak extending from the base of the bill over the eye to the neck, and the abdomen at the lowest part, are pure white. On the lateral parts of the neck, the black and white portions are separated by a defined line; but on the other parts, the tints pass irregularly into each other. The plumes of the lower parts of the back and of the hypochondriæ are lengthened, and the loosely diffused silky barbs are provided at the base with a down of a plumbeous colour, which also appears on the thighs. The general colour of the bill is yellow, but the upper mandible has a black mark, broad at the base, including the nares, and tending to a point in the middle of the bill. The irides are yellowish white, the feet brown with a plumbeous hue, and the claws have a pale horny colour. The entire length of our bird is eight inches, its weight nine drams. The wings are of moderate length, and the tail projects about two inches beyond them. The tarsi are elongated and rather slender. The claws are sharp, and strongly compressed. The posterior toe is robust, and its claw proportionally large and strong; in this character our bird is analagous to the *Philedons*. The attitude and proportions of our bird are accurately given in the figure; and it is presumed that the details will clearly illustrate the characters by which it is distinguished, as well from *Cinnyris* as from *Philedon*.

The *Pomatorhinus montanus* belongs to those tribes of birds, which in Java are found exclusively in forests, covering mountains that have an elevation of about 7000 feet above the level of the ocean. It never migrates from these into the lower regions. Although necessarily confined in its range, and limited to the distant conical summits of a series of mountains that extends longitudinally through the Island, it is very abundant in particular places. I met with it at various points; but the cold climate of the Mountain Merbaboo, one of the highest peaks in the central part of Java, and the summit of Mount Prahū, both of which exceed the elevation above mentioned, appeared its favourite places of residence. Here it builds its nest on high trees. Its food is plentifully supplied by the berries of various species of *Rubus*, as well as by the fruits of numerous vegetables, which cover these elevated districts. About the middle of the day, our bird is seen, through the openings of the forest, in small flocks; it then emits incessantly a loud note, in imitation of which the natives have applied to it the name of BOKKREK.



PRINIA FAMILIARIS.

Painted by J. Gould.

PRINIA FAMILIARIS.

ORD. II^{me} LES PASSEREAUX, *Cuvier*. 4^{me} Famille, Les Ténuirostrès.

ORD. VI^{me} ANISODACTYLES, *Temminck*.

ORD. II. PICÆ, *Linn. Syst.*

ORD. II. AMBULATOIRES, *Illiger*. Fam. 8, Ténuirostrès.

PRINIA, *Nobis*.

CHARACTER ESSENTIALIS.—*Rostrum* apice validiusculum. *Maxilla* basi recta, apice levissime arcuata. *Mandibula* myxa longiuscula, sursum inclinata. *Tomia* maxillæ mandibulæque integerrima. *Alæ* breves obtusæ. *Cauda* elongata cuneata. *Tarsi* graciles longi.

CHARACTER NATURALIS.—*Rostrum* mediocre, rectum, basi paululum latius quam altum, ultra nares sensim compressum, apice validiusculo integerrimo. *Maxilla* basi recta, apice levissime arcuata: *culmine* inter nares carinato, deinde rotundato. *Mandibula* recta, basi depressa; *myxa* longiuscula, sursum inclinata.

Nares basales, magnæ, in fovea oblonga antice angustiore positæ, membrana tectæ, parte inferiore rima longitudinali apertæ.

Alæ obtusæ. *Remiges*: prima abrupte, secunda et tertia gradatim breviores, reliquæ subæquales, tertia ad septimam externe tenuiter emarginatæ. *Cauda* elongata cuneata.

Pedes elongati; tarsi et digiti graciles. *Digitus* medius longiusculus, cum exteriori basi coalitus. *Hallux* medio antico parum validior. *Ungues* compressi, rectiusculi, hallucis medio antico duplo major. *Acropodia* et *acrotarsia* scutulata.

AFFINITAS.—Genus hocce, etsi *Sylviæ* nonnullam affinitatem præbet, tamen rostro integerrimo et compresso habituque toto, *Certhiadis* magis convenit: inter has juxta *Orthotomum* (Nostrum) vel *Opetiorhynchum* Cel. *Temminckii*, locum exposcere videtur.

PRINIA FAMILIARIS.

Prinia olivaceo-fusca, abdomine flavo, gula pectore fasciisque duabus alarum albis, rectricibus, intermediis subconcoloribus exceptis, fascia lata subterminali per-fusca.

Prinya, of the Javanese.

Prinia familiaris, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 165.*

Familiar Creeper, *Gen. Hist. of Birds by John Latham, M. D. Second Edition, 1822, Vol. IV. p. 264. n. 72.*

IN proposing our *Prinia familiaris* as the type of a new genus in Ornithology, I foresee the objection that its characters are not sufficiently prominent. They are in some degree of a negative nature. They consist chiefly in the absence of a notch in the bill, in the narrowness of the transverse dimensions of this organ, and in a general external habit, which associates our bird with the *Certhiadae*. If these do not afford it the rank of a distinct genus, our bird may be placed provisionally in the genus *Sylvia*; but the diversified character of the subjects which are at present arranged in this assemblage of birds, has deterred me from adding to it any bird which does not obviously belong to the true type of *Sylvia*. Our bird differs as much from this type as *Troglodytes* and *Regulus*; and the bill of the former, which is entirely without a terminal notch, shews, with its other characters, the existence of several distinct forms, which have hitherto been arranged under *Sylvia*, without the necessary discrimination.

The genus *Prinia* was first defined in the Systematic Catalogue of Javanese Birds, which was printed in the XIIIth Volume of the Linnean Society's Transactions. In the detail of its characters, the genus *Pomatorhinus* was chiefly kept in view, and *Prinia* was stated to differ in the comparative straightness of the bill, in the more gradual attenuation of this organ, and in its being destitute of the horny covering to the nares. The examinations which I have again instituted, in preparing to give a figure of *Prinia* in this Work, have confirmed my original conclusion, that it is more properly arranged among the *Certhiadae* than among the *Dentirostres*. The affinity of our bird to *Orthotomus*, which in the Catalogue above mentioned is placed next to it, affords a further illustration of its character, and a guide in its natural arrangement. The straightness of the bill, which characterizes our bird, occurs in various other *Certhiadae*. The genus *Opetiorynchos* of M. Temminck is an instance of this. In the *Analyse du Systeme general d'Orni-*

PRINIA FAMILIARIS.

thologie, it is placed next to *Certhia*; and M. Temminck is of opinion, that our genus *Orthotomus* agrees essentially with *Opetiorynchos*.

The bill of the *Prinia familiaris* agrees with the head in length. It is nearly straight at the base; from the middle of its length the upper mandible is very slightly arched; the lower mandible is comparatively robust; it is greatly depressed at the base, increases in dimensions to the middle, where the myxa (in Illiger's language) begins, and thence rises very gradually to the point. Both mandibles are entire, and the cutting edges are somewhat diaphanous. The culmen of the upper mandible is rounded and broad, and the sides are regular, and very slightly convex. The general regularity of its form, the broad culmen, the smallness of the horizontal diameter at the base, and the complete absence of the terminal notch, distinguish our bird from *Sylvia*, as exhibited in the true type of that genus. The form of the bill is carefully expressed in the illustrations which are added to the Plate in letter (*a*). In the figure of the bird the bill appears somewhat larger in its vertical diameter than it is in nature. The nostrils are rather large, situated in an oblong depression near the base, covered in the upper portion with a membrane, and pierced in the lower part with a longitudinal aperture. Our bird is represented of natural size on the Plate. The entire length is five inches. The wings are short and obtuse: the first of the quill-feathers is short; the second and third increase successively; from the fourth to the seventh they are of equal length; the others, to the twelfth, are scarcely perceptibly shorter: from the third to the seventh the exterior vane is very slightly emarginate. The tail is wedge-shaped, and as long as the body. The tail-feathers are disposed in pairs; the first, or exterior pair, is short; the second abruptly longer; the third, fourth, and fifth increase very gradually in length. The tarsi are slender and elevated, and the anterior toes delicate and compressed; the middle toe exceeds the others in length, and is united to the outer, which is rather longer than the interior toe, at the base; the hind toe is robust, and of moderate length. The claws are compressed, slightly arched, and nearly acute. The claw of the hind toe has double the size of that of the middle toe.

The colour of our bird is dark brown above, with a faint tint of orange. The throat and neck anteriorly are white, and the breast and abdomen pale sulphureous yellow. The wings are crossed transversely, in an oblique direction, with two white bands. The tail-feathers, with the exception of the two intermediate ones, are marked near the end with a broad band of blackish brown; the tips are dirty white. The intermediate tail-feathers have throughout a brownish tint underneath,

PRINIA FAMILIARIS.

and near the extremity an almost imperceptible transverse band of a deeper hue. The tarsi are yellowish, and the bill has both above and at the point a brown corneous tint, while its base is pale yellow. The irides are dark coloured.

The *Prinia familiaris* is abundant in many parts of Java, near villages and gardens. In the confines of these it builds its nest on trees and shrubs. Its motions are sprightly. It sports among the branches in short rapid flights, and enlivens the neighbourhood with pleasant notes, from which the native name is derived.

On our Plate the necessary illustrations of the bill and feet of *Prinia familiaris* are represented, under the letters *a*, *b*, *c*, and *d*. A separate view of the tail is also given, to shew the proportional length and disposition of the tail-feathers.



CALYPTOMENA VIRIDIS.

CALYPTOMENA VIRIDIS.



ORD. II^{de} PASSEREAUX, *Cuvier*.

ORD. II. PICÆ, *Linn. Syst. Sect. III. Pedibus gressoriis.*

ORD. II. AMBULATORES, *Illiger*.

CALYPTOMENA, *Raffles. Act. Soc. Linn. Lond.*

CHARACTER ESSENTIALIS.—*Rostrum* mediocre, crassum, arcuatim attenuatum. *Maxilla* calyptra plumosa velata, unguiculata, emarginata. *Rictus* amplus. *Vibrissæ* nullæ. *Nares* tubulosæ, horizontales, apertura subrotunda ad marginem calyptræ. *Cauda* rotundata brevis. *Pedes* gressorii. *Digiti* compressi, medio longitudine tarsi.

CHARACTER NATURALIS.—*Rostrum* mediocre, crassum, validiusculum, sub oculi canthum posteriorem productum, de basi lata ad apicem arcuatim attenuatum. *Maxilla* ad basin et ultra medium, calyptra plumosa velata, apice nudo, adunco, compresso; *culmine* carinato; *dextro* subelongato, unguiculato, emarginato. *Tomia* recta, acuta, plumulis calyptræ lateralibus, multifidis, setaceis, recumbentibus, in serie laxa subbifaria dispositis, obtecta. *Mandibula* depressa, *gnathidiis* de rictu ad apicem recte protensis, *tomiis* acutis, apice emarginatis, *gonyde* brevi, angulo mentali magno plumulis setaceis vestito. *Rictus* amplus. *Vibrissæ* nullæ.

Nares tubulosæ: tubulus horizontalis longus apertura subrotunda simplici, ad marginem anteriorem calyptræ sita ejusque plumulis recondita. *Lingua* brevis.

Alæ longiusculæ acuminatæ. *Remiges*: prima mediocris; secunda ad quartam, quæ longissima, gradatim longiores, tertia et quinta æquales, sexta abrupte brevior. *Cauda* brevis rotundata.

Pedes breviusculi, gressorii. *Tarsi* robusti, basi plumosi. *Acrotarsia* oblique scutulata. *Digiti* compressi, tenues, medius longitudine tarsi; internus externo brevior, externus medio ad tertium, internus ad secundam phalangem connexus, hallux medio antico brevior robustior. *Ungues* compressi acutissimi: medii antici et hallucis mediocres æquales, externi et interni minores.

CALYPTOMENA VIRIDIS.

AFFINITAS.—Hoc genus pedibus Eurylaimo maxime convenit; necnon aliis characteribus illo similitudinem præbet. Rostris forma tamen Dentirostribus magis simile est. Multa itaque de victu, vitæ more et præcipue de structura anatomica mox notanda sunt, priusquam in ordinem naturalem sit dispositum an inter Dentirostres an Syndactylos.

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Calypomena viridis nitens, macula utrinque ad latus nuchæ fasciis alarum tribus obliquis remigibusque præter marginem exteriorem atris.

*Burong Tampo Pinang*, of the Malays.

Calypomena viridis, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra, Tr. Linn. Soc. XIII. p. 295, 1822.*

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“ THIS very singular and beautiful bird is about six inches and a half in length. Its colour is a brilliant green, like that of the Parrots. The head is rather large, and its feathers are directed forwards from each side, in such a manner as nearly to conceal the bill, giving the face a very peculiar appearance. A little above and before the eyes, the feathers are of a deep velvet-black at their base, and only tipped with green; and there is a similar spot of black immediately over the ears. The wings are scarcely longer than the body, green, but crossed on the coverts by three velvet-black bands; the primary feathers, as well as the whole under-side of the wings, are dusky approaching to black, with the exception of the outer margins of some, which are edged with green. The tail is short, rounded, composed of ten feathers, which are green above, and blueish-black below. The whole of the under parts are green: this colour is lightest on the sides of the neck, and round the eyes. The bill is short, wide, much depressed at the base, deeply cleft, and hooked at the point. Nostrils oval at the base of the bill, and concealed by the filiform feathers that project over them. The eyes are rather large; the irides blueish. Legs blueish-black: a few feathers come down over the upper part of the tarsi. Feet gressorial; outer toe not much shorter than the middle one, with which it is united as far as the last joint.

“ The stomach of this bird contained nothing but vegetable substances, chiefly wild grains. It is found in the retired parts of the forests of Singapore, and the interior of Sumatra; and being of the colour of the leaves, and perching on the higher branches of the trees, it is not easily procurable. The female does not differ in appearance from the male. The name of *Calypomena*, (α καλυπτω, velo) is proposed for this genus.”



### CALYPTOMENA VIRIDIS.

To the preceding description, which is given in the words of Sir Stamford Raffles, I have only to add a few remarks on the illustration of this genus, and on its affinity. Referring therefore to the Plate, in which the characters are given in detail, letter *X* exhibits the bill as seen from above. It was necessary to give a separate view of this organ, as in the general figure of the bird, every part, except the tip and the margin of the lower mandible, is concealed. The object of this view is more particularly to shew the extent of the bill, its outline, and its gradual attenuation, by means of a slightly arched margin. In the profile, letter *Z*, the extent of the tubular portion of the nostrils, and their relation to the plumose covering of the upper-mandible is indicated, together with the posterior union of both mandibles, by which the wide-gaping mouth is formed. The structure of the bill in *Calyptomena* is, however, essentially different from that of the *Hiantes* of Illiger, comprising the Goat-suckers and Swallows, which have both a small bill, united to an excessively wide mouth and throat. But in *Calyptomena* the bill is quite as long as the head, although the posterior portion, including the nostrils, is hid from view by the beautiful plumes of the upper-mandible, which give a singular and highly ornamental appearance to this bird. The structure of the feet and of the toes is distinctly shewn in letter *Y*.

Although I have associated *Calyptomena* with *Eurylaimus*, which in the Second Number of these Researches has been arranged among the *Syndactyles* of Cuvier, I have to acknowledge that my ideas regarding its natural affinity are not yet clear. The examination of this genus has again excited the inquiry, whether *Eurylaimus*, to which it is so nearly related, is with propriety arranged among the *Syndactyles* of Cuvier. In the structure of the feet these two genera entirely agree: they also both have a wide-gaping mouth, and a bill notched at the extremity; but in *Calyptomena*, this organ is much more nearly allied in structure to the bill of the *Dentirostres* of Cuvier than in *Eurylaimus*. It greatly resembles the bill of the genera *Rupicola*, *Pipra*, *Phibalura*, *Pardalotus*, *Platyrrhynchus*, and *Procnias*. All these birds have further a natural resemblance in the structure of their feet, which consists in an union of the toes, particularly of the outer and middle toe, existing in different degrees, but perhaps most strongly in *Calyptomena*. The genera above mentioned are arranged, nearly in succession, by the celebrated Temminck, in his extensive order of *Insectivores*: it remains, therefore, still to be determined by future inquiries, whether, when more accurately known, they will not be found to constitute a distinct Family among the *Passereaux* of Cuvier, connecting the Family of *Dentirostres* with that of *Syndactyles*.









*A. Pictor del*

*Printed by C. Hulsmantel*

PODARGUS JAVANENSIS.

## EURLYLAIMUS JAVANICUS.



ORD. II<sup>de</sup> LES PASSEREAUX, *Cuvier*. 2<sup>de</sup> Division. Les Syndactyles:

ORD. VII<sup>me</sup> ALCIONES, *Temminck*.

ORD. II. PICÆ, *Linn.* Syst. Sect. III. Pedibus gressoriis

ORD. II. AMBULATOIRES, *Illiger*.

### EURLYLAIMUS, Nobis.

CHARACTER ESSENTIALIS.—*Rostrum* capite brevius, validum, depressum, basi postice dilatatum. *Rictus* amplissimus. *Maxilla* culmine obsoleto, apice adunco, emarginato, tomiis verticalibus. *Nares* basales, subrotundæ, apertæ, nudæ. *Pedes* gressorii. *Digit*i compressi, medius fere longitudine tarsi. *Alæ* cauda breviores. *Rectrices* 12.

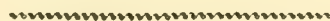
CHARACTER NATURALIS.—*Rostrum* capite brevius, validum, depressum, lateribus ad apicem in cuneum attenuatis, basi latissimum, corneum; postice utrinsecus dilato-ampliatum, margine intracto, angusto, sub oculos producto. *Maxilla* lateribus parum inclinatis basi latioribus; *culmine* obsolete-carinato, rotundato, apice abrupte adunco, spatulato, emarginato; *tomiis* latis, porrectis, acutis, verticalibus, nigris. *Mandibula* depressa, *tomiis* verticalibus, basi rectis, versus apicem maxilla congruenter curvatis, obsolete emarginatis, acumine brevissimo obtuso terminali. *Vibrissæ* paucae mustacales. *Rictus* amplissimus.

*Nares* basales, laterales, subrotundæ, apertæ, omnino nudæ.

*Alæ* cauda breviores. *Remiges*: prima brevior, secunda et quarta æquales, tertia longiuscula, quinta gradatim, sexta et ceteræ abrupte breviores. Cauda subrotundata: *rectrices* 12, externæ paulatim breviores.

*Pedes* mediocres, gressorii. *Tarsi* basi plumis tecti. *Digit*i compressi, tenues, medius longus (longitudine fere tarsi), internus externo brevior, externus medio ad tertiam, internus ad secundam phalangem connexus, hallux medio antico paulo brevior, robustus. *Ungues* compressi; medii antici et hallucis mediocres, externi et interni minores subæquales.

AFFINITAS.—Genus hocce pedibus familia Syndactylarum quadrat, rostro generi Platyrhyncho, familiæ Dentiostrium affine; difficilis tamen dispositio naturalis. Pedes enim gressorii et totus habitus, consociationem Dentiostribus dissuadent. Syndactylis, nullo genere characteribus exterioribus convenit; moribus et victu tamen Alcedini simile.



## EURYLAIMUS JAVANICUS.

*Eurylaimus capite toto corporeque subtus vinaceis, dorso alisque perfuscis flavo variis, cauda atra fascia subterminali alba.*

*Eurylaimus Javanicus, Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 170.*

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IN proposing again a new genus in Ornithology, it is necessary to detail with clearness the reasons and comparisons by which I have been guided in this proposition. The genus to which *Eurylaimus*, in a principal character, is nearly allied, is *Platyrhynchus*, as established by Mr. Desmarest, and which comprises, besides the species to be enumerated in the sequel, the *Todus rostratus* and *Todus nasutus* of Latham. I have to remark, in the first place, that, although on a superficial view, there appears a resemblance between these two genera, it is, in my opinion, much less striking than that which exists between *Pitta* and *Myiothera*, of which the former constitutes an Asiatic group, which is supplied in America by the latter. As far as regards *Platyrhynchus*, we have the authority of Mr. Temminck for proving that, with probably one or two exceptions, its range is confined to America; while *Eurylaimus* has only been found in the Indian Archipelago. As types of the genus *Platyrhynchus*, Mr. Temminck gives *Lanius Pitangua* of Linnæus, and *Platyrhynchus olivaceus* and *Platyrhynchus caneromus*, two new species, which are figured in the Second Number of *PLANCHES COLORIÉES*, a splendid Work, serving as a continuation of the *Planches Enluminées*, and published jointly by Mr. Temminck and the Baron Laugier.

Referring for the characters of *Eurylaimus* to the detailed description given in the natural character of that genus, I proceed to a comparison of the characters of *Lanius Pitangua*, and of the two species of *Platyrhynchus* above mentioned, as far as the figures referred to have enabled me to make it. The bill of *Lanius Pitangua* is essentially different; it is longer than the head; the culmen, or back, is proportionally prominent, and presents a defined ridge, from which the sides decline gradually, and constitute an elevated upper mandible; the cutting edges, or tomia, instead of being perpendicular, as in *Eurylaimus*, are rounded and inflected: the bill in *Lanius Pitangua* is also less broad at the base; the edges are continued nearly straight to the gape under the eye, and not extended backward under that organ into a narrow incurved margin, which forms an excessively wide throat, from which the generic name of *Eurylaimus* is derived.

The nostrils in *Lanius Pitangua*, instead of being perfectly naked and open, are covered above by a small membrane, while numerous long decumbent vibrissæ



## EURLAIMUS JAVANICUS.

pass over them. These characters are likewise exhibited in the figures of *Platyrhynchus olivaceus* and *cancromus*. The tip of the bill, in all these species, constitutes a hook more long and acute than in *Eurlaimus*. In the feet the union of the outer and middle toe extends only to the first articulation; while in *Eurlaimus* these toes are completely united through the whole of the first and second phalanx, and the interior and middle toe adhere closely in the first phalanx, as is accurately represented in the Plate of Illustrations. The tarsi are proportionally short. In taking all these characters into consideration, I have no hesitation to propose *Eurlaimus* as a distinct genus, to be arranged among the *Meropidæ* or *Syndactylæ*. *Les Syndactyles, Cuv.*

In further confirmation of my views, I shall adduce the opinion of Sir Stamford Raffles. In the Catalogue of a Zoological Collection, made in the Island of Sumatra under his direction, which has been communicated to the Linnean Society, at the conclusion of the Second Part, containing a description of birds belonging to this Collection, Sir Stamford remarks:—"Besides the birds above mentioned, which are referable to known genera, there are three belonging to the division of *Picæ*, with gressorial feet, which differ essentially from all hitherto described, and must constitute two new and distinct genera of that order." After describing the first, he proceeds:—"The second genus belonging to the same order, is characterized by a very large, thick, strong bill, wide and rounded at the base, hooked and slightly notched at the point. The edge of the lower mandible is incurved under the upper. Nostrils not covered. Feet gressorial. Of this genus there are two species; they are both found in the interior of Sumatra; and the second species enumerated is also met with at Singapura."—From these observations we can also, in some measure, determine the range of this genus; it extends from Sumatra eastward to Singapura, and thence South to the eastern extremity of Java, near the Straits of Baly, where I discovered it in the year 1806: since that period I have not met with it again. We are indebted to Sir Stamford Raffles for the following remarks on the first species:—"It frequents the banks of rivers and lakes, feeding on insects and worms. It builds its nest pendant from the branch of a tree or bush which overhangs the water."—I found it in Java, in one of the most distant and inaccessible parts, covered with extensive forests, and abounding with rivers and marshes.

The entire length of the *Eurlaimus javanicus* is eight inches. The bill has half the length of the head, and measures nine lines. The head, sides of the neck, and the whole of the neck and body underneath are of a violet, or rather vinous colour, varying with different degrees of intensity. The plumes on the summit of the head are lengthened, and extend to the occiput, where they form a very obscure

### EURLAIMUS JAVANICUS.

crest. The ground of violet is variegated here with deep brown; in a certain light also it presents a reddish lustre. That part of the forehead which surrounds the bill is nearly black; behind the nostrils, near the gape, a few vibrissæ are protruded, and the margin of the lower mandible is surrounded by stiff plumes of a dark colour, extending towards its base. The throat and the neck anteriorly have with the violet a plumbeous lustre, and on the breast and belly this colour is considerably diluted. The vent is yellow. The brown colour of the plumes which cover the upper part of the neck, becomes darker towards the back, and assumes a sooty tint. The wings above are very deep blackish brown, more intense near the shoulder, and lighter towards the extremity. A yellow streak, formed by a series of narrow plumes, between the coverts and secondary quill-feathers, passes longitudinally along the wing, and meets, near its lower termination, an interrupted transverse band of the same colour, caused by a very small semilunar mark, on the exterior margin of the secondary quill-feathers, near their lower extremity. The quill-feathers are white from their base to about one-half of their length; but the coverts of the wing are so disposed, that they leave a part of the base open, which appears as an irregular white spot on the exterior margin. The wings underneath, from the axillæ towards the shoulder, are covered with yellow plumes, which appear in an exterior border of that colour. Below this, somewhat interiorly, is a brown spot, made up of very minute plumes, closely applied to the surface of the wing. The sides of the back are of an intensely brown colour; in the middle it is variegated with plumes, on which portions of black and yellow are unequally distributed. The coverts of the tail are lengthened, black at the base, and yellow towards the extremity, so that the uropygium appears yellow. From the lower part of the back a broad black spot stretches towards the hypochondriæ. The tail consists of twelve feathers:—the two intermediate ones are entirely black; the four next in order on each side are of the same colour, having near the extremity a white transverse band; on the two exterior feathers this band is near the middle, and rather broader. The bill is reddish brown at the base; towards the extremity both mandibles are irregularly variegated, and striped: in the upper mandible the culmen, or back, is uniformly of a yellowish colour. The cutting edges are intensely black, and shining. The tarsi and toes have a dusky yellowish hue, and the claws are brown, inclining to black.

On the Plate of Illustrations, in letter *P.* and *Q.*, the bill and foot of *Eurlaimus javanicus* are represented, as far as is necessary for elucidating the generic description.







*A. Feltcher del.*

*Printed by C. Nodding.*

ALCEDO BIRU.

*London. Pub<sup>d</sup> by Kingsbury, Parbury and Allen, 7 Leadenhall St. June, 1829.*

## ALCEDO BIRU.

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ORD. II<sup>de</sup> LES PASSEREAUX, *Cuvier*. 2<sup>de</sup> Division. Les Syndactyles.

ORD. VII<sup>me</sup> ALCIONES, *Temminck*.

ORD. II. PICÆ, Sect. III. Pedibus gressoriis, *Linn.* Syst.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 6. Angulirostres.

ALCEDO, *Linn. Lath. Cuv. Temm. Illiger, &c.*

CHAR. GEN.—*Rostrum* capite longius, rectum, porrectum, validum, tetragono-compressum, acuminatum, acutum, culmine subdistincto, dorsato, recto, gonyde, ascendente, mandibulis subæqualibus. *Tomia* subtilissime incisulo-fimbriata. *Vibrissæ* nullæ.

*Nares* in basi maxillæ prope culmen sitæ, superne tectæ, inferne rima longitudinali patentes. *Lingua* brevis, carnosa, plana, fere sagittata.

*Pedes* breves, congrui, gressorii, tibia inferius denudata. Tarsus digiti medii dimidium tantum æquans. Digiti antichi externi subæquales, coadunati apice discreti, internus dimidio brevior, interdum nullus. *Unguis* medius acie interna dilatata. *Acrotarsia* obsolete, *acrodactyla* apertius scutulata. (*Illiger*.)

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\* *Rostro gracili, culmine carinato.*

Alcedo subazurea nitore thalassino, remigibus interne caudaque subtus fuscis, gula jugulo abdomine macula colli laterali alisque subtus albis.

*Meninting-watu* seu *Burung-Biru*, of the Javanese.

Alcedo Biru, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 175.*

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IN the Systematic Catalogue of Birds from Java, which was printed in the XIIIth Volume of the Transactions of the Linnean Society, the views of M. Temminck regarding Alcedo were adopted. When the Catalogue was prepared, the examination of the various species from that Island, suggested clearly a division of

## ALCEDO BIRU.

the genus into two sections, founded on certain differences which exist in the form of the bill. After continued inquiries, and the examination of subjects from other parts of the world, I can now state with confidence, that the characters of each of these sections are sufficiently marked and permanent to sanction a separation into two distinct genera, the peculiarities of which I shall now enumerate.

In the *first* the bill is very long, slender, gradually attenuated to a sharp point, compressed to such a degree that the height considerably exceeds the breadth, having both mandibles carinated, and marked with longitudinal grooves, and the cutting edges, or tomia, slightly bent inwards. The *Alcedo Ispida* furnishes a sample of this genus. In the *second* the bill is of a light consistence, greatly distended, broad at the base, and gradually tapering towards the extremity, which is moderately compressed. The upper mandible is even, or very slightly grooved from the nostrils to the point; the back, or culmen, is rounded, not prominent or keeled, and the extremity of the upper mandible forms a cavity for the reception of the lower; the latter is depressed at the base, swelled towards the middle, then gradually attenuated to a point, which is acute, and somewhat smaller than the upper. The cutting edges, tomia, are sharp; those of the upper mandible are slightly curved, while those of the lower are straight: near the tip the upper mandible is slightly bent downwards, while the lower inclines upwards in a small degree. The *Alcedo sacra* furnishes a sample of this genus.

Besides these, a *third* natural division of *Alcedo*, as it was defined by the earlier Ornithologists, is afforded by the Gigantic Kingfisher of New Holland. For this the name *DACELO* was proposed by Dr. Leach, and it has received the sanction of the celebrated Temminck, in the "Analyse du Systeme général d'Ornithologie," prefixed to the Second Edition of his Manuel. The bill in this genus does not exceed the head in length, and it is stronger and more dilated than the bill of the individuals belonging to the second genus. The cutting edges, towards the extremity, take a bold curve upwards, and are deeply cut out; the tip is greatly lengthened, and terminated by a small notch. The lower mandible is considerably swelled; the margin is not straight, but curved upwards, to meet the curve of the upper mandible. A new species, the *Dacelo pulchella*, described in the Second Number of these Researches, has lately been added to this genus from Java.

The propriety of these views, as far as regards the division of *Alcedo*, of the earlier Ornithologists into two genera, is confirmed by the Author of the Zoological Illustrations, William Swainson, Esq. In the Fifth Number of this work, the second genus is described with the name of *HALCYON*, while *ALCEDO* is applied to



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the first, and the characters of both genera are clearly defined. In the Museum of Joshua Brookes, Esq. of Blenheim Street, the second genus is distinguished by the name of ENTOMOPHILA, from the Manuscripts of Dr. Leach; and the characteristic name of M. Le Vaillant, which has been applied to the second section of the genus Alcedo, in the Catalogue above mentioned, (*p.* 173,) has there suggested the name of ENTOMOTHERA.

The Alcedo Biru is by no means uncommon in Java. I observed it chiefly in the interior, in low situations; but it is also found in the maritime districts. Its habits and manners are those of the European Kingsfisher. It darts in short, rapid flights along the surface among rivulets and lakes, emitting as it moves shrill sounds in a high key. These sounds are so strong and acute, that when the bird is near, they strike the ear in an unpleasant manner. Our bird is not unfrequently observed perched on trees on the banks of rivulets. Its food, as in the European species, consists of small fishes, and of aquatic insects.

The Alcedo Biru has the general proportions of the birds belonging to the first section of Alcedo. The body is slender. The entire length is five inches and one fourth. The bill measures one inch and six lines. The feet and the tail are short. The colours are very simple. The whole of the upper parts, with a broad band covering the breast, have a beautiful tint, varying according to the light to which the bird is exposed, from pure azure-blue to sea-green. The throat, the lower part of the neck, the abdomen, the vent, the wings underneath, a line extending from the base of the bill to the anterior angle of the eye, and a rhomboidal mark on the side of the neck, are white. The extremity of the wings, and the tail underneath, have a dark brown colour inclining to black, which is more saturated on the bill and feet. The blue colour of the upper parts is subject to a few slight modifications: on the crown of the head, and on the neck, it is variegated with transverse undulations of a brown tint: this tint agreeing with that of the extremity of the wings, also appears in the base of the silky plumes which cover the back. The coverts of the wings have also transverse bands of a darker tint. The colour of our bird changes with its relative position to the light: it assumes various tints, from pure azure to blueish green, and to saturated verdigris-green. The white mark on the neck behind the ears, is formed by a loose tuft or series of plumes of a white colour, exceeding the other plumes in length, and provided at the extremity with long delicate silky barbs.

In the Plate which illustrates this article, our bird appears in its greenish lustre, which is most intense on the lower part of the back, and on the coverts of the tail.









*J. Pollock del.*

*Printed by C. Melhuish.*

**CENTROPUS BUBUTUS.**

*London, Pub. by Knapton, Parbury and Allen, Ludlow-hall S. E. 1899.*

# CENTROPUS PHILIPPENSIS.

VAR. JAVANICA.

ORD. III<sup>me</sup> LES GRIMPEURS, *Cuvier*.

ORD. V<sup>me</sup> ZYGODACTYLES, *Temminck*.

ORD. II. PICÆ, *Linn. Syst. Sect. II. Pedibus scansoriis.*

ORD. I. SCANSORES, *Illiger, Fam. 3. Amphiboli.*

CENTROPUS, *Illig. Cuv. Temm.*

CUCULUS, *Gmel. Lath. &c.*

CHAR. GEN.—*Rostrum* capite brevius, incurvum, valde compressum, grypaneum.

*Tomia* integerrima.

*Nares* plumis recumbentibus tectæ.

*Cauda* gradata, elongata.

*Pedes* scansorii, congrui. *Digiti* externi internis longiores, antici fissi, posticorum externus versatilis? *Ungues* incurvi, posticus internus reliquis aliquantum longior, rectiusculus, subulatus. *Illiger*.

Centropus cyaneo-nigro nitens, alis badiis.

*Bubut*, of the Javanese.

Centropus Philippensis, *Cuv. Règ. anim.* 426.

Coucou des Philippines, *Buf. VI.* p. 369.—*Pl. Enl.* 824.

Cuculus ægyptius, Var.  $\beta$  *Linn. Syst. Ed. Gmel. I.* p. 420.—*Lath. Ind. Orn.* p. 213.

Egyptian Cuckow, *Lath. Syn. II.* p. 523. 16. *A.*

Centropus Bubutus, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII.* p. 180.

Cuculus Bubutus, *Sir T. S. Raffles's Cat. of a Zool. Coll. made in Sumatra. Trans. Linn. Soc. XIII.* p. 286.

## CENTROPUS PHILIPPENSIS.

THE Bubut affords a good illustration of the genus *Centropus*. Among the species which compose it, is a small group, the individuals of which have a general agreement both in their external covering and in their cry, although distributed through very distant countries. They are found not only in New Guinea and in the Philippine and Sunda Islands, but their range extends to Madagascar, and thence through the Continent of Africa to Senegal and Egypt. The species which constitute this small group have as yet not been clearly defined; and by several ornithologists of the first eminence, the adult and the young bird are described with different denominations. Although in the Systematic Description of Javanese Birds the Bubut has been enumerated as a distinct species, a re-examination of the various specimens in our Collection, and a comparison of the varieties in size and external marks with the figures of Buffon and Levaillant, have induced me, at least for the present, to unite it with the *Centropus Philippensis* of Cuvier. It tends to confirm the near relation which exists between the species composing the small group above mentioned\*; their note has suggested nearly the same name in the most distant countries: it is *Bubut* with the Javanese; *Houhou* in Egypt; and *Toulou* in Madagascar. They likewise resemble each other in their manners and their food. In the Islands of the Indian Archipelago, as well as in Egypt, they are seldom seen in forests, but frequent low bushes; they live solitary, or in single pairs, and they feed chiefly on locusts. Their external covering is similar, both regarding the distribution of colours and the particular properties of the plumage. The feathers of the head, neck, back, breast, abdomen, and tail have a very dark blue tint inclining to black, with a strong gloss, which is purple on the summit of the head and neck, yellowish green with a metallic lustre on the tail, and more uniform and dark underneath. But it varies in different individuals according to their age, and according to the light to which they are exposed. A peculiar property of the plumes covering the head and neck, which belongs to all *Centropi*, shews itself more strongly in the group which comprises the Bubut. The plumes are very rough and rigid, and the barbs are separated and again subdivided, constituting, according to Illiger, compound plumes with bristly lateral filaments. The tail is gradated, and consists of ten broad feathers, decreasing regularly in size from the intermediate ones to the two exterior feathers, which are abruptly shorter.

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\* I consider this small group to consist of the following species, agreeably to M. Cuvier's arrangement, as given Règne anim. 426, in the note:—1. *Cuculus Ægyptius* and *Senegalensis*, which are united by M. Cuvier. 2. *Centropus Philippensis*, Cuv. 3. *Centropus nigrorufus*, Cuv. 4. *Centropus Tolu*.



### CENTROPUS PHILIPPENSIS.

The Egyptian Cuckow, which is clearly described by Buffon and Latham, affords a general illustration of the birds of this group. The figure annexed to this article exhibits accurately the dress of the adult Javanese Bubut. The dark parts have a very strong gloss, modified as above described.

Several specimens of the young bird, contained in the collections at the India House, shew the change which gradually occurs in the plumage of the Bubut. The general dark tint of the upper parts spreads partially over the wings; the colour is obscure and sooty on the tail, and without any metallic lustre.

Although the Bubut does not belong, in strict propriety, to the design of the present Work, I have introduced it as exhibiting the Javanese dress of a bird belonging to an extensively distributed group, which preserves its manners and note in the most distant regions; but I take this opportunity of stating, that to complete the number of original figures intended for this Work, an additional subject will be given in one of the following Numbers.

In the figure which illustrates this article, the Bubut is represented somewhat less than half the natural size.









DACILO PULCHELLA.

## DACELO PULCHELLA.

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ORD. II<sup>de</sup> LES PASSEREAUX *Cuvier*. 2<sup>de</sup> Division. Les Syndactyles.

ORD. VII<sup>me</sup> ALCIONES, *Temminck*.

ORD. II. PICEÆ, *Linn.* Syst. Sect. III. Pedibus gressoriis.

ORD. II. AMBULATOIRES, *Illiger*. Fam. 6. Angulirostres.

DACELO, *Leach*, *Temminck*.

CHAR. GEN.—*Rostrum* mediocre, porrectum, validum, crassum, tetragono-attenuatum, subdepressum. *Maxilla* lateribus planis, dilatatis, versus apicem deflexa utrinque profunde emarginata, ipsa extremitate truncata excisa, culmine rotundato obsoleto, tomis acutis. *Mandibula* basi magis depressa, attenuata, acuminata gonyde subascendente. *Nares* basales, laterales, parte dimidia plumis obtectæ, rima ovatuscula patentes. *Pedes* breves, congrui gressorii. *Digit*i antici externi coadunati apice discreti internus breviusculus.

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Dacelo supra thalassino atro alboque fasciata, capite badio saturato, vertice occipiteque azureis, gula juguloque albidis, abdomine ferrugineo diluto.

*Tengke-watu*, Javanis.

Dacelo pulchella, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 175.*

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ALTHOUGH this bird has the habit and appearance of a King's-fisher, its bill presents several strongly marked peculiarities distinct from the King's-fishers in general, but agreeing with the gigantic species peculiar to New Holland, which is distinguished by the name of "Laughing Jack-ass." The peculiarities of the latter, as far as regards the bill, induced Dr. Leach to separate it from the King's-fishers into a genus denominated Dacelo, which has been adopted by the celebrated M. Temminck, in his "Analyse du Systeme Général d'Ornithologie," prefixed to the Second Edition of his Manuel. In comparing our bird with the Gigantic King's-fisher, I have observed, besides an agreement in the form of the bill, other points of resemblance regarding the habit and general distribution of colours in both: these have already been stated in the Description of a Collection of Birds from Java, contained in Vol. XIII. of the Transactions of the Linnean Society, in the following remark:—"In both the forehead and crown are regularly circumscribed by the lateral parts of

### DACELO PULCHELLA.

“ the head and a posterior collar. The under-parts are uniform ; the wings above  
“ and the tail are transversely banded.”

This bird fully deserves the epithet given to it in the specific denomination ; it exhibits a very beautiful display of colours, which requires little illustration by description. In its residence in Java, as far as I have been able to ascertain, it is extremely local. I found it once only, in a low range of hills, about twenty miles South East of Semarang, known in the central parts of the Island by the name of Hills of Prowoto. Here a single bird was obtained in the forest.

The *Dacelo pulchella* has on the forehead and sides of the head a very saturated chesnut colour, which is continued in a broad band round the lower part of the neck. The crown of the head, the occiput, and the upper part of the neck, are covered with an oblong mark, with regularly defined sides of a beautiful azure, having a few transverse dots of white and black. The upper part of the wings and the back exhibit a beautiful variety of sea-green, black and white, disposed in transverse bands, which are produced by the distribution of colours in the plumes covering these parts. The wing coverts, the scapulars, and the plumes of the back and uropygium, are marked alternately with bands of white and black, and have a terminal band of sea-green. The quill-feathers are entirely black, and the secondary feathers have alternately a broad black and a narrow white band. The tail-feathers are twelve in number ; the shafts of all are intensely black and shining : of the eight intermediate feathers the interior barb consists of bands alternately black and white ; and the exterior, of bands alternately black and blue. The feather next following on each side has the interior barb like the others ; but the exterior barb has the alternating bands partly blue and partly white ; the exterior feather on each side has the barbs on both sides alternately banded black and white. Of the under parts the throat is whitish, and the breast and abdomen very diluted ferruginous. The wings beneath are whitish in the axilla, and as far as the base of the quill-feathers extends ; the extremity of these is brown. The bill has a saturated orange tint, which is paler towards the base ; and the feet and claws agree in colour with the abdomen.







PHENICOPHAUS JAVANICUS

## PHŒNICOPHAUS JAVANICUS.

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ORD. III<sup>me</sup> LES GRIMPEURS, *Cuvier*.

ORD. V<sup>me</sup> ZYGODACTYLES, *Temminck*.

ORD. II. PICÆ, *Linn. Syst. Sect. II. Pedibus scansoriis*.

ORD. I. SCANSORES, *Illiger. Fam. 3, Amphiboli*.

PHŒNICOPHAUS, *Vieillot, Temminck*.

LES MALCOHAS, *Vaill. Cuv.*

CHAR. GEN.—*Rostrum* mediocre sive longiusculum, validum, crassum, glaberrimum, arcuatum, culmine rotundato, tomiis integerrimis. *Nares* laterales lineares aut ovatusculæ, prope basin rostri sitæ vel remotæ; vibrissæ sparsæ ad basin rostri. Regio ophthalmica nuda mamillaris. *Cauda* gradata elongata. *Alæ* breves rotundatæ: remiges: prima ad quartam gradatim increscentes; quarta et quinta longissimæ. *Pedes* scansorii congrui. *Digiti* externi internis longiores. *Acropodia* scutulata.

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Phœnicophaus cano-viridescente niger, malis gula jugulo crisso cruribusque ferrugineo-badiis, rectricibus apice albis.

*Bubut-kembang*, of the Javanese.

Phœnicophaus javanicus, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 178.*

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EVERY ornithologist is acquainted with the difficulties which not unfrequently occur in the classification of birds. After the most careful examinations and comparisons, a doubt remains in many cases, as to the propriety of a disposition. This was the case with the bird which was described with the name of *Phœnicophaus javanicus*, in the Systematic Arrangement of Birds from Java, published in the XIIIth Volume of the Transactions of the Linnean Society, and which has been selected for the present article. Our bird has a relation, as well to the genus *Cuculus* as to that of *Phœnicophaus*, while in some characters it differs from both; and I have now to state my reasons for associating it with the latter. The peculiarities which require notice, in discriminating these two genera, are the relative compression and length of



### PHŒNICOPHAUS JAVANICUS.

the bill, the form and disposition of the nares, and the presence of a naked mamillary space surrounding the eyes. In the general form of the bill, our bird is nearly allied to several oriental species of *Cuculus*, particularly to *Cuculus clamosus*; but the latter is not provided with vibrissæ. In possessing these, as well as in the peculiar lustre of the bill, our bird agrees with *Phœnicophaus melanognathus*; but a more accurate and critical examination of the bill of the *Phœnicophaus javanicus*, would probably suggest the propriety, either of establishing a distinct division in the genus *Phœnicophaus*, or of considering our bird as the type of a new genus. The nares of *Cuculus xanthorhyncus*, *C. flavus*, and *C. fugax*, possess, in a striking degree, the character which is given to them in the generic description; they are circular, and surrounded with a naked, tubular, membranaceous eminence. In *Phœnicophaus javanicus*, on the contrary, they are linear, and partially covered by the vibrissæ at the base of the bill; while in *Phœnicophaus melanognathus* they are nearly oval, situated at the base of the bill, and a longitudinal groove extends, parallel to the margin, toward the border. The naked mamillary circle about the eyes is less extensive in our bird than in *Phœnicophaus melanognathus*, but it exists in a sufficient degree to distinguish it from the *Cuculi* above mentioned, in which there is no trace of it. The feet of our bird present nothing peculiar, and in the wings it agrees strictly with *Phœnicophaus*.

The general physiognomy of our bird is that of the *Phœnicophai*. The body and neck are slender, and the tail exceeds them considerably in length. The entire length is eighteen inches, nearly eleven of which are occupied by the tail, which is gradated. The upper parts generally are greenish-gray; a metallic lustre is diffused over them, shewing itself stronger on the upper parts of the tail, and on the extremity of the wings, on which the tint is saturated, inclining to black. The head is of a lighter tint, inclining to plumbeous, and without any lustre. The base of the bill is surrounded with vibrissæ, straggling, and pointing anteriorly and posteriorly. The cheeks, the throat, the neck anteriorly, the vent, and the thighs, have a ferruginous-chestnut tint, which in the latter is darker, inclining to rufous. The lower parts of the breast and the abdomen have the plumbeous colour of the head, more diluted, and slightly variegated with chestnut. The bill is red and shining, the naked space about the eyes yellowish, and the feet are black. About half an inch of the extremity of the tail-feathers is tipped with white, and the irides have also a whitish hue. On the Plate our bird is represented two-thirds of the size of life.

The *Phœnicophaus javanicus* is found in the society of various species of *Centropus*, at the confines of large forests, in plains covered with low shrubs, and solitary trees. It resembles the *Phrenotrix Temmia* in its habits and manners. The shortness of its wings permits only interrupted flights. It is chiefly observed about noon, and is remarkable by the beauty of its form. It is not found in great abundance.



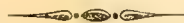


CUCULUS LUGUBRIS.

London: Pub<sup>d</sup> by Kingsbury, Parbury, & Allen: J. Leadenhall St<sup>h</sup> Oct. 1893.



## CUCULUS LUGUBRIS.



ORD. III<sup>me</sup> LES GRIMPEURS, *Cuvier*.

ORD. V<sup>me</sup> ZYGODACTYLES. *Temminck*.

ORD. II. PICÆ, *Linn. Syst. Sect. II. Pedibus scansoriis.*

ORD. I. SCANSORES, *Illiger. Fam. 3. Amphiboli.*

CUCULUS, *Linn. Briss. Lath. Temm. Illiger, &c.*

CHAR. GEN.—Rostrum mediocre, compressum, modice curvatum. *Tomia* integerima. *Rictus* amplus. *Nares* prope rostri basin sitæ, membrana nuda obtectæ, aut marginatæ, apertura ovali. *Alæ* mediocres, remigum tertia longissima. *Cauda* gradata, elongata, rectricibus decem aut duodecim. *Pedes* scansorii, congrui. *Tarsi* basi plumis tecti. *Digiti* externi internis longiores, antici basi leviter connexi, posticorum externus versatilis. *Acropodia* scutulata. *Ungues* omnes incurvi.



Cuculus ater nitore viridi, remigibus exterioribus pogonio interno albo notatis, rectricibus duabus externis crissoque albo fasciatis, tibiis postice albis.

*Awon-awon*, of the Javanese.

Cuculus lugubris, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 179.*

Mournful Cuckow, *Gen. Hist. of Birds by J. Latham, M. D. 2d Edition, 1821. Vol. III. p. 286, N. 32.*



THE Cuculus lugubris is found in districts of secondary elevation, which are diversified with extended ranges of hills, and covered with luxuriant forests. The southern and western parts of Java are generally of this description. In the extensive central plains intervening between abrupt, conical, and elevated mountains, and which are generally in a high state of culture, and covered with flourishing towns and villages, I have rarely observed it. This bird retires into the deepest coverts, and, having a dark plumage, it is with difficulty surprised. Its peculiarities, both as to voice and general habits, have not, as far as is known to me, been

### CUCULUS LUGUBRIS.

observed. Its habits are very different from those of the *Cuculus orientalis* and the *Cuculus flavus*, which are both very abundant in Java. The former, although it delights in shady woodland tracts, gladly seeks the confines of villages, and is universally known by the cry of *Tuhu-tuhu*, from which the native name is derived. The *Cuculus flavus* descends into the plains and cultivated tracts, where it is heard in the morning from almost every tall tree. It has three distinct notes, which it repeats in great regularity with a loud but not unpleasant voice, although by many natives it is considered as ominous of evil.

But although our bird differs from the *Cuculus orientalis* in its habits, it greatly resembles it in the external covering. It has a slender, somewhat lengthened form; the tail is of moderate length, and wedge shaped, though in a less degree than in many other Cuckows. It is slightly forked, and the divisions are rounded at the extremity; this organ consists of ten feathers, of which the two exterior ones reach scarcely to its middle. The others are of equal length, have very broad internal vanes, and are disposed at the sides in two series, capable, to appearance, of being divaricated at the pleasure of the bird. In the form of the bill, the peculiarity of the nares which occurs in this genus, and in the structure of the feet and claws, it agrees with the true Cuckows. The general colour of our bird is deep greenish black; but a strong lustre is spread over the plumage, which varies, according to its position towards the light, from green, with a yellow metallic reflection, to purple and blue. This colour is darkest on the head and back. The wings underneath are brown. The quills are marked on the internal vane with a white spot, and collectively exhibit, when the wings are expanded underneath, a large transverse band. The two short exterior tail-feathers are obliquely banded with white, the bands being distinct at the extremity, and gradually evanescent towards the base. The plumes of the vent have likewise delicate white bands: on the thighs the plumage is thick and somewhat lax, and a few white filaments appear among the black feathers. The bill and feet are black: the irides dark coloured.







*A. Peltier del*

*Printed by CHallmandel*

CUCULUS XANTHORHYNCHUS.

*London: Published by Black, Kingsbury, Parbury & Allen, 7, Leadenhall Street, February 1822.*

## CUCULUS XANTHORHYNCHUS.



ORD. III<sup>me</sup> LES GRIMPEURS, *Cuvier*.

ORD. V<sup>me</sup> ZYGODACTYLES, *Temminck*.

ORD. II. PICÆ, *Linn. Syst. Sect. II. Pedibus scansoriis.*

ORD. I. SCANSORES, *Illiger. Fam 3. Amphiboli.*

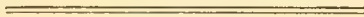
CUCULUS, *Linn. Briss. Lath. Temm. Illiger, &c.*

CHAR. GEN.—Rostrum mediocre, compressum, modice curvatum. *Tomia* integerima. *Rictus* amplus. *Nares* prope rostri basin sitæ, membrana nuda obtectæ, aut marginatæ, apertura ovali. *Alæ* mediocres, remigum tertia longissima. *Cauda* gradata, elongata, rectricibus decem aut duodecim. *Pedes* scansorii, congrui. *Tarsi* basi plumis tecti. *Digiti* externi internis longiores, antici basi leviter connexi, posticorum externus versatilis. *Acropodia* scutulata. *Ungues* omnes incurvi.



Cuculus violaceus, axillis ventre cruribus rectricibusque externis albo fasciatis, rostro flavo.

Cuculus xanthorhynchus, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 179.*



THE yellow-billed Cuckoo of Java, comparatively with other species of this Genus, has a broad bill, a highly arched covering to the nares, and a greatly elongated exterior hind toe. The wings are also proportionally long and slender: in its other characters it agrees with the rest of the Genus. Among the Javan species it most nearly resembles the *Cuculus flavus*; it has a similar form and general distribution of colour, but it is very rarely met with, and never allows itself to be approached. I have procured two individuals only, which agree in size and characters: I have not had an opportunity of observing it in a state of liberty.

### CUCULUS XANTHORHYNCHUS.

Entire length, six inches and one half. Head and upper parts deep brown, with a beautiful violet reflection, which in a certain light exhibits a metallic lustre. Quill feathers, and four exterior tail feathers on each side, deep blackish-brown. Three exterior tail feathers banded with white: the smallest is tipped with white at the end, and the bands are nearly equal in breadth on both vanes; on the second, the bands on the external vanes are broader; and on the third they are greatly contracted, and confined to the exterior vane. The breast, abdomen, thighs, and axillæ are pale ferruginous, and marked with regular transverse bands of deep brown, on which a metallic lustre is occasionally perceptible. The plumes of the front and crown of the head are capable of being elevated to a very slight crest.







*A. Pilleter del.*

*Printed by C. Hallmandel.*

PERDIX PERSONATA .

*London Pub by Kingsbury, Parbury & Allen, 7 Leadenhall St. April 1824*

## PERDIX PERSONATA.

ORD. IV<sup>me</sup> LES GALLINACÉS, *Cuvier*.

ORD. XV<sup>me</sup> GALLINACÉS, *Temminck*.

ORD. V. GALLINÆ, *Linn. Syst.*

ORD. IV. RASORES, *Illiger*. Fam. 20, Gallinacei.

PERDIX, *Briss. Lath. Cuv. Temm. Illig. &c.*

TETRAO, *Linn.*

CHAR. GEN.—*Rostrum* breve, crassiusculum, compressiusculum, basi nudum, maxilla fornicata, convexa, subadunca, mandibulæ gonyde recta porrecta. *Nares* basales, laterales, squama fornicali superne semiclausæ, antice implumes. *Lingua* carnosa, integra, apice acuta. *Caput* plumatum; circa oculos sæpius maculæ implumes verrucosæ. *Alæ* breves; remigibus tribus exterioribus gradatim brevioribus, quarta et quinta, vel sæpius quinta, longioribus. *Cauda* brevis, deflexa, rectricibus densis. *Pedes* tetradactyli, insidentes, mediocres, congrui, nudi. *Tarsus* maris calcaratus, rarius tuberosus aut muticus. *Tarsotheca* clypeato-scutulata. *Acrodactyla* scutulata. *Hallux* digito interno plus dimidio brevior. *Ungues* falculares, paululum incurvati, acutiusculi. *Illiger, Temminck.*

Perdix supra fusca subtus cinereo-fuscescens, gula collo antice et ad latera lineaque superciliari albis, pileo colloque postice et torque collari nigris, alis abdomine crissoque maculis transversis lunulatis nigris et castaneis.

Perdix orientalis, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 165.*

THE *Perdix personata*, which is represented in our Plate of natural size, agrees with the *Perdix javanica* in the general contour of the body, in the shortness of the



## PERDIX PERSONATA.

tail, and in the slenderness of the claws; but the naked area about the eyes is comparatively small. The distribution of the white plumes over the face and neck, gives to our bird in some degree the appearance of wearing a mask: the name of *personata* is therefore now applied to it. In the Systematic Catalogue of Javanese Birds, printed in the Linnean Society's Transactions, it was named *orientalis*; but the latter, being a *topical name*, is not admissible, according to the present views of ornithologists: I therefore make use of the opportunity still afforded me of proposing a name, against which this untoward objection does not lie. On each side of the bill, behind the nostrils, rises a small tuft of half erect plumes, of a white colour, which is continued backward as a superciliary line, and after several interruptions, gradually disappears on the sides of the neck: the throat, the cheeks, and the anterior and lateral parts of the neck are covered with plumes of the same colour, which are regularly bounded and encircled at the sides and before, with the dark brown plumage of the neck and breast, which also passes upwards in a narrow band, encircles the eyes, and meets the base of the bill. The upper parts of the head and neck are very dark brown, inclining to black. The general colour of the plumage is brown; it is dark brown, with a faint tint of olive-gray above; underneath it passes into blueish-gray. The colour is uniform on the back, on the superior extremity of the wings, and on the tail; the scapulars and the lower portion of the wings are variegated with black and chestnut: the greater coverts have, in many cases, a broad black band near the extremity, which marks the vanes unequally; on that vane which is directed upward, it is defined by an oblique line extending towards the point; on the opposite vane it follows the shaft, and occupies a greater portion of the feather: a chestnut band, about one line in breadth, crosses the black band near the extremity. On several of the interior of the secondary quill-feathers, and on the scapulars, a chestnut ground occupies the extremity, which has a rhomboidal mark on the shaft, and a black band at the extremity, with several indistinct dots of the same colour: several of the tail-feathers are also marked with dotted bands of black. On the lower part of the breast the brown colour assumes a blueish cast, which becomes gradually fainter towards the abdomen, the lowest part of which, with the vent and thighs, is dirty white. The plumes of the hypochondriæ and the vent-feathers are transversely marked near the end, (which has a brown band), with a broad black band, which in many cases is arched and semilunar. The colour of the feet and of the irides is pale reddish-yellow; on the claws the tint is yellowish-white.

This bird inhabits the elevated woods of the Province of Blambangan, near the eastern extremity of Java, and was once only observed during my travels.





A. Pelletier del.

Printed by C. Hullmandel.

ARDEA SPECIOSA.

London: Pub<sup>d</sup> by Kingsbury, Parbury, & Allen, 7 Leadenhall St. Oct<sup>r</sup> 1823.



## ARDEA SPECIOSA.



ORD. V<sup>me</sup> LES ÉCHASSIERS, *Cuvier*. 3<sup>me</sup> Famille, Les Cultirostres.

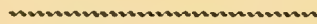
ORD. XIII<sup>me</sup> GRALLATORES, *Temminck*.

ORD. IV. GRALLÆ, *Linn.* Syst.

ORD. VI. GRALLATORES, *Illiger*. Fam 30, Herodii.

ARDEA, *Linn. Briss. Lath. Cuv. Temm. &c.*

CHAR. GEN.—*Rostrum* capite longius, crassum, rectum, compressum, elongato-conicum, acuminatum, acutum, mandibulis subæqualibus, maxilla utrinque sulco, antrorsum evanescente, exarata, culmine basi subdistincto, in apicem sensim deflexo. *Tomia* sæpius subtilissime oblique incisula, maxillaria pone apicem emarginata. *Nares* prope basin in sulco laterali sitæ, lineares, longitudinales, superne postice membrana tectæ. *Lingua* mediocris, oblonga, plana, acuta, membranacea. *Lora* cum orbitis implumia. *Alæ* tuberculatæ. *Pedes* grallarii, elongati, congrui, tetradactyli, colligati, digitis omnibus angustolomatinis. *Hallux* digitum medium dimidium vel æquans, vel superans, cum digito interno basi connexus, incumbens. *Ungues*: falculæ falcatæ, medius acie interna pectinatim incisula. *Tarsus* digito medio paulo longior. *Acrotarsia* clypeata, clypeis superioribus scutuliformibus, rarius scutulata. *Acrodactyla* scutulata. *Illiger*.



*Ardea cristata* alba, dorso nigro, collo supremo flavescente antice pectoreque rufis, rostro basi albente.

*Blekko irêng*, of the Javanese.

*Ardea speciosa*, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 189.*

*Ardea malaccensis*, *Linn. Syst. Ed. Gmel. 1, p. 643.*

*Ardea senegalensis*, *Linn. Syst. Ed. Gmel. 1, p. 645.*

Crabier blanc et brun de Malac, *Buff. Hist. Nat. des. Ois. VII. p. 394.—Pl. Enl. 911.*

Petit Héron roux du Sénégal, *Pl. Enl. 315.*



## ARDEA SPECIOSA.

THE bird represented in the 911th Number of the Planches enluminées, and described by Buffon as *Crabier blanc et brun*, from Malacca, is also very abundant in Java; and various specimens are contained in the Honourable Company's Museum. The native name is BLEKKO: this is also applied to the *Ardea speciosa*, which is represented on the Plate annexed to this article, and the epithet of *irêng*, or black, is added for the sake of distinction. This bird, in its different states of plumage, was a frequent object of my inquiries; and it appears, from a reference to my notes, that in Java I considered the *Ardea malaccensis* and the *Ardea speciosa* as specifically different, and as such they are enumerated in my Catalogue of Birds from that Island. It is therefore necessary, in this place, to give a concise comparative description, from the specimens which I collected.

In the *Ardea malaccensis*, which exhibits the dress of the Blekko in its younger state, the head above, and the neck are covered with brown plumes, of a livid hue, which have a white or pale yellowish line along the shaft. The colour of these plumes is more intense on the crown of the head; on the lower parts of the neck, the longitudinal line is broader, and the neck appears marked with brown and yellowish streaks. In the specimens more advanced to maturity, plumes of a rufous colour are mixed with those that cover the head and neck. The crest is entirely wanting in very young subjects; as the bird advances to maturity, it shews itself in a few very long, linear plumes, which have a chestnut coloured line along the shaft, and are bordered with brown. The back has an intense livid brown colour, with a blueish reflection; this is also observed on the tips of several of the secondary remiges. As the bird further passes to maturity, the plumes covering the anterior portions of the neck also gradually assume a chestnut tint, inclining to rufous. An indication of this tint also shews itself on the breast. The throat, the lower part of the breast, the abdomen, the wings, and the tail, are pure white. The feet and the upper mandible, throughout its whole length, are black. The irides are intensely yellow.

In the *Ardea speciosa*, which represents the Blekko in its complete dress, the head above, and the adjoining portions of the neck, in its entire circumference, are Isabella yellow, with a rufous tint; this becomes more intense on the lower parts of the neck: on the long lax plumes, which cover the neck before and behind, the breast, and the anterior part of the abdomen, the colour is chestnut, with a rufous, slightly ferruginous hue. The colour of the back is intensely black, with a faint livid blue reflection when exposed to the light. The scapulars, and the tips of the

## ARDEA SPECIOSA.

secondary quill feathers, have a diluted livid tint, inclining to brown, which gradually becomes fainter as the bird increases in age. The plumage on the wings, the tail, the lower part of the abdomen, the thighs, and the throat, are pure white. The feet are dark yellowish brown, and the tibiæ naked, nearly half an inch above the tarsi. The crest consists of from four to six greatly lengthened linear plumes, of a very pure milk-white colour. The bill is dusky at the base; hence two-thirds of its length are pale yellowish white, and the tip is black. The irides are yellow. The plumes on the neck and back are divided into numerous greatly lengthened filiform barbs, resembling, in some measure, those of the Egret. The entire length of our bird is nineteen inches.

Buffon's figure of the Crabier blanc et brun, exhibits the Blekko in its young state. After this period it assumes a different dress, the neck becomes rufous, and the long lax plumes which form the crest, distinctly shew themselves. The Javanese specimens differ from Buffon's figure in having black feet.

The changes which the various species of *Ardea* undergo in their plumage, as they pass to the state of maturity, have been the cause of much inaccuracy and confusion in this genus, and in many instances the dress of the different ages of our bird has caused the description of a species. The labours of MM. Meyer and Temminck have pointed out many of these mistakes and "double emplois." The *Ardea malaccensis* and the *Ardea senegalensis*, of the systems, both, according to M. Temminck, represent the same bird, which is shewn to be the young Blekko. Those Naturalists who do not admit the use of specific names of animals from the countries in which they have been discovered, will require no apology from me for abandoning the names of *Malaccensis* and *Senegalensis*, and for adopting a more appropriate denomination for a bird which is found in Senegal, in Malacca, in Java, and probably in various other parts of the East, and of which, as far as I have ascertained, the young bird only has been represented in an engraving.

The *Ardea speciosa* lives, like other herons, near rivers and lakes, and feeds on fishes, insects, &c. In some parts of the Island it may be seen during the whole year; but many tracts are only visited in the rainy season, when the inundation of the rice plantations invites it in great numbers. It forms its nests on shrubs and trees: the eggs are collected, and disposed of in the markets; the flesh also is occasionally eaten by the natives. Our bird, if taken young, is easily domesticated, and is not unfrequently seen in this state, in the villages situated on the banks of rivers and lakes.







Printed by i. H. Stansfield

S'COLOPAX SATURATA.

A. B. S. del.





## SCOLOPAX SATURATA.

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ORD. V<sup>me</sup> LES ÉCHASSIERS, *Cuvier*. 4<sup>me</sup> Famille, Les Longirostres.

ORD. XIII<sup>me</sup> GRALLATORES, *Temminck*.

ORD. IV. GRALLÆ, *Linn. Syst.*

ORD. VI. GRALLATORES, *Illiger*. Fam. 32, Limicolæ.

SCOLOPAX, *Linn. Briss. Lath. Cuv. Temm. Illiger, &c.*

CHAR. GEN.—*Rostrum* elongatum, gracile, molliusculum, teretiusculum, rectum, apicibus mandibularum obtusis, mortuis rugoloso-scabris, sulco medio exaratis, maxillæ apice prominulo, incrassato. Mandibulæ sulco, tomia legente, culmen distinguente, versus apicem evanescente exarata. *Nares* basales membrana tectæ, apertura lineari, longitudinali antrorsum patentēs. *Lingua* mediocris, angusta, acuta. *Facies* attenuata, plumata. *Alæ* tuberculata. *Pedes* grallarii, mediocres, congrui, tetradactyli, fissi. *Hallux* phalangem digiti antici æquans, tenuis, apice insistens. *Ungues* falculares. *Tarsus* digito medio brevior. *Acropodia* scutulata. (*Illiger.*)

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*Scolopax saturato-fusco castaneoque varia, supra fasciis alternis inæqualibus, collo antice pectoreque æqualibus, abdomine et crisso dilutioribus, occipite obscuris. Tekken*, of the Javanese.

*Scolopax saturata*, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 191.*

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THE *Scolopax saturata* belongs to the first section which M. Temminck has established in this genus. It agrees with the European and American Woodcocks, not only in its manners and place of abode, but also in certain external marks, which readily distinguish the birds of this section from the other species of *Scolopax*. These exhibit themselves in the tibiæ being covered with plumes to the knees, in a bill proportionally of great length, in a white extremity to the tail-feathers underneath, and in three or four transverse bands on the posterior part of the head and

### SCOLOPAX SATURATA.

neck. But our bird is distinguished from the *Scolopax rusticola*, and from the *Scolopax minor*, by the darkness and uniformity of its colour, and by the regularity and simplicity of its transverse bands.

The *Scolopax saturata* is generally variegated with alternate bands of deep brown and chestnut. On the upper parts the bands are nearly regularly transverse in their disposition, but the brown bands are considerably broader than those of a chestnut colour. On the middle of the back, large patches of brown are irregularly scattered; and the extremity of the tail is dark, and terminated by a narrow band of a sooty colour. The forehead is variegated with small bands of deep brown and chestnut. On the back part of the head, and on the neck above, the tint is very dark inclining to black; and three transverse chestnut bands exhibit the character of this section. A black line extends from the base of the bill to the anterior canthus of the eye. At the base of the lower mandible is a whitish spot. The throat, the anterior part of the neck, and the breast, are marked with alternate bands of brown and chestnut, of equal breadth. On the abdomen, vent, and thighs, the alternate bands are pale inclining to yellowish-white; and in this peculiarity of a paler tint to the under parts, our bird agrees with the other Woodcocks. The tail also has the same disposition as in the *Scolopax rusticola* and *minor*. The tail-feathers are tapering towards the extremity, and have a white band underneath, at the tip. The feet and the bill have a brownish colour, inclining to tawny. In size, our bird agrees with the American Woodcock. It is figured on the Plate, of natural size.

A single individual only of the *Scolopax saturata* is contained in the Museum of the Honourable East India Company. This was obtained near the banks of a mountain-lake, many miles from a human habitation, in the forests of Mount Prahu, about 7000 feet above the level of the ocean. This part of Java, which is rarely visited even by the natives themselves, contains a great variety of rare and interesting animal and vegetable productions. Not only on account of its locality, but also on account of its nocturnal habits, in which it agrees with the other birds of the section, it is obtained with great difficulty. It forms its nest on the earth, and remains concealed during the greatest part of the day. Its food is most plentifully supplied by larvæ of insects, and by worms of every description, which abound in the vegetable mould covering these elevated districts.







*A. Pelletier del.*

*Printed by C. Hullmandel*

PARRA SUPERCILIOSA.

*London: Pub<sup>d</sup> by Kingsbury, Parbury & Allen: 7 Leadenhall St.<sup>e</sup> April 1824*

## PARRA SUPERCILIOSA.

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ORD. V<sup>me</sup> LES ÉCHASSIERS, *Cuvier*. 5<sup>me</sup> Famille, Les Macroductyles.

ORD. XIII<sup>me</sup> GRALLATORES, *Temminck*.

ORD. IV. GRALLÆ, *Linn.* Syst.

ORD. VI. GRALLATORES, *Illiger*. Fam. 33, Macroductyli.

PARRA, *Linn. Lath. Illig. Temm. &c.*

CHAR. GEN.—*Rostrum* mediocre, crassiusculum, rectum, compressum, æquale, apice conico-acuminatum, acutum, maxilla utrinque sulco lato antrorsum evanescente, basi subcerigera, ceromate basi supra et lateribus in paleam carunculaceam plerumque exeunte, dextro altiore, in apicem convexo-deflexo, mandibulæ gonyde adscendente. *Nares* in sulco maxillæ sitæ, ceromate tectæ, pone medium pertusæ apertura elliptica longitudinali pervia. *Alæ* calcaratæ: remige prima, secunda et tertia vix brevior. *Cauda* brevissima aut mediocris. *Pedes* grallarii, elongati, congrui, tetradactyli, fissi. *Digiti* elongati, graciles, cum unguibus tarsum æquantes, hallux digito medio dimidio brevior, at cum ungue illum fere æquans, incumbens. *Ungues* elongati, tenues, recti, acuminati, compressi, subtus canaliculati; posticus reliquis duplo longior, subrecurvus. *Tarsus* digitorum medium æquans. *Acropodia* scutulata.

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*Parra* atro-viridis nitens, lineis superciliaribus albis, dorso alisque viridi-olivaceo nitentibus, remigibus nigris, uropygio caudaque castaneo-rufis nitore violaceo.

*Pichisan*, of the Javanese.

*Parsa superciliosa*, *Horsf. Syst. Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 194.*

Indian Jacana, *Lath. Gen. Hist. of Birds, Second Edition, Vol. IX. p. 394. Var. A.*

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THE *Parra superciliosa* is found both on the continent of Asia, and in the islands of the Indian Archipelago. Dr. Latham enumerates several varieties of the Indian Jacana. The description of one of these, from a Javanese specimen, agrees with our bird. In Dr. Hamilton's drawings of Indian Birds, preserved in the Museum at the India House, it has the name of *Parra superciliosa*, and is indicated

### PARRA SUPERCILIOSA.

as a variety, by the epithet of minor. In the Systematic Catalogue of Birds from Java, this name was also applied to it; and this confirms the propriety of its employment, as it was given before any reference had been made to the drawings of Dr. Hamilton, to whom is due this notice of the priority of its application. Our bird agrees with the other Jacanas in the great length of the tarsi and toes. I have therefore to remark, that on our Plate the tarsi are represented in a small degree shorter than should have been the case; this has arisen from the attitude in which the specimen in the Museum was placed.

The *Parra superciliosa* measures, from the point of the bill to the end of the tail, eleven inches and one half; the entire length of the bird, from the bill to the extended toes, is nearly eighteen inches: the individuals vary considerably in size. The plumage of the head, neck, breast, and body underneath, is deep black, with a reflection of the most saturated green, which, when exposed to the light, exhibits a gloss of deep emerald green. The greater and lesser coverts of the wings have a tint of deep olive green, with a metallic lustre, inclining to brown. All these feathers are lengthened, and directed across the wing, and are capable of being raised so as to expose the spur. The direction of the secondary quill-feathers appears to be similar; the wing is consequently of great breadth, and peculiarly fitted to assist the bird in walking. The quill-feathers, both primary and secondary, are black; but this tint towards the extremity passes into brown, and has a considerable splendour. The tail has a brilliant brown colour, inclining to reddish; this is more saturated on the coverts of the tail, and acquires a dark violet or purple gloss, which is observably more intensely tinted on the lower part of the neck, and also slightly shews itself on the plumes which cover the back. A pure white line extends from the anterior angle of the eye along the head towards the neck, affording a strongly marked character to our bird. The colour of the bill is sulphureous yellow on every part, excepting the upper mandible, from the nostrils to the forehead; here the membranaceous covering of the base of the bill, and the frontal clypeus, is of a dark blue colour inclining to brown; the clypeus itself is large, and almost regularly rounded. The feet have a brownish gray colour, and the irides are dark brown. The spur of the wings is conical, obtuse, of moderate length, and of a yellow colour.

In Dr. Hamilton's drawing of the *Parra superciliosa*, the distribution of colours is precisely the same as in the Javanese specimens, but the tints are less brilliant. At the base of the upper mandible an attenuated red line, nearly half an inch in length, is observed, which is mentioned in Dr. Latham's description. In its manners the *Parra superciliosa* agrees with other birds of this genus: it is by no means rare near the confines of lakes, or of artificial reservoirs of water, in many parts of Java.







*A. Pelletier del.*

*Printed by C. Hulman.*

ANAS ARCUATA.

*London Pub<sup>d</sup> by Kingsbury, Parbury & Allen, 7 Leadenhall St<sup>h</sup> April 1854*

## ANAS ARCUATA.

ORD. VI<sup>me</sup> LES PALMIPÈDES, *Cuvier*. 4<sup>me</sup> Famille, Les Lamellirostres.

ORD. XV<sup>me</sup> PALMIPÈDES, *Temminck*.

ORD. III. ANSERES, *Linn.* Syst.

ORD. VII. NATATOIRES, *Illiger*. Fam. 38, Lamellosodontati.

ANAS, *Linn. Briss. Lath. Cuv. Illig. Temm. &c.*

CHAR. GEN.—*Rostrum* mediocre aut capite longius, crassum, rectum, basi altius quam latum, interdum gibbosum, versus apicem depressum et ibidem paulo latius, epidermide (ceromate) tectum, dextro et myxa distinctis, unguiformibus, suborbiculatis, convexis, dextro apice deflexo obtuso; mandibula angustiore quam maxilla, hujus lateribus occultata, gnathidiis ad myxam usque distantibus. *Tomia* lamellosa-dentata, lamellis transversis longioribus, in mandibulis etiam gnathidiorum latera externa occupantibus. *Margo* externus maxillæ a basi versus apicem recta porrectus. *Nares* laterales, culmini plerumque propiores, membrana seu ceromate tectæ, apertura pone medium aut ante basin sita ovali aut subrotunda, longitudinali, patula, pervia. *Lingua* margine fimbriata. *Alæ* volatiles, sæpius tuberculatæ. *Pedes* breves, congrui, aversi, tetradactyli, palmati, hallucis digiti medii phalangem æquante, nunc simplici, nunc lomate aucto, apice insistente. *Digitus* medius lateralibus, externus interno longior. *Ungues* falculares. *Tarsus* digito medio paulo brevior. *Podotheca* reticulata, carina acrotarsali et acrodactylis plerumque scutulatis. *Illiger*.

Anas supra nigrescente fusca subtus castanea abdomine saturatiore subvinaceo, alis supra medium badiis, collo lunulis nigris arcuato, plumis dorsalibus arcuatim fascia badia terminatis, capite supra nuchaque fuscis, gula pallidiore.

*Meliwis*, of the Javanese.

Anas Javanica, *Horsf. Systematic Arrangement of Birds from Java, Linn. Trans. Vol. XIII. p. 199.*



## ANAS ARCUATA.

THE *Anas arcuata* is found in Java, both near the coast and in the interior ; but its residence is regulated by the changes of the seasons. During the period of the rains, it partially retires from the rivers and lakes, and visits the inundated grounds and marshes. The delicacy of its flesh makes it a favourite object of pursuit with sportsmen ; but it is not easily surprised. Several varieties are distinguished by the natives. The common *Meliwis* is represented on our Plate ; in a somewhat more diversified dress, it is called *Meliwis kembang* ; and a smaller variety has the name of *Meliwis batu*. For the name of *Anas javanica*, originally applied to it, I have substituted the name by which, according to the information communicated to me by M. Temminck, it is distinguished by M. Cuvier, in the Museum of Paris, in the specimens presented by M. Leschenault. As far as I have ascertained, it has not yet been figured. The name of *arcuata* corresponds with its external marks.

The figure annexed to this article represents the *Anas arcuata* two-thirds of the natural size. The entire length, from the bill to the tail, is eighteen or nineteen inches. It is a bird of very beautiful form and attitude. The bill is of moderate length, and marked in the middle with an even prominent ridge, to which the broad sides rise with a moderate convexity : at the base the confines are perpendicular, and of great height. The neck and the sides of the head have a pale chestnut colour, inclining to a yellowish-gray ; this colour gradually increases in strength and intensity on the breast, and on the abdomen it assumes a reddish-brown tint, somewhat vinaceous. The summit of the head and neck is brown. All the quill-feathers, the outer coverts, the tail-feathers, and the back have a pure brown colour, of a very dark blackish hue. On the breast, neck, and upper parts of the back, semilunar marks, of the same brown colour, are transversely disposed ; and the plumes of the back are bordered at the extremity, in the form of an arch or semicircle, by a narrow chestnut band. The anterior and upper portion of the wings is covered with plumes of a very vivid chestnut tint. The vent-feathers, and several of the plumes of the flanks, which also shew themselves above at the base of the tail, are of a dirty yellowish white ; on the thighs, plumes of the same colour are irregularly bordered with brown. The bill and the feet are black.

# General Catalogue of Javanese Birds,

ARRANGED IN THE

MUSEUM OF THE HONOURABLE EAST INDIA COMPANY.

THE first column contains the names of the Systematic Arrangement and Description of Birds from the Island of Java, read before the Linnean Society of London, April 18, 1820, and published in the XIIIth Volume of their Transactions. The second column exhibits the changes which have been occasioned since this period, by the rejection of *topical* names, by the introduction of several names employed in the Nouveau Recueil de Planches coloriées d'Oiseaux, published by M. M. Temminck and Laugier, and by other necessary alterations in Nomenclature.

## ORDO I. ACCIPITRES.

### FAM. II. FALCONIDÆ.

*Falco cærulescens*, Linn.  
*Falco Tinnunculus*, Linn.  
*Falco severus*, H.  
*Falco Pondicerianus*, Gm.  
*Falco Ichthyætus*, H.  
*Falco Soloënsis*, H.  
*Falco melanopterus*, Daud.  
*Falco Bido*, H.  
*Falco Limnæetus*, H.

*Falco Aldrovandi*, Reinw. 1827

*Falco cuculoides*, T. 1821

*Falco Bacha*, Le Vaill.

### FAM. III. STRIGIDÆ.

*Strix Javanica*, Gm.  
*Strix badia*, H.  
*Strix Selo-pulo*, H.  
*Strix rufescens*, H.  
*Strix castanoptera*, H.  
*Strix Lempiji*, H.  
*Strix orientalis*, H.  
*Strix Ketupu*, H.

*Strix pagodarum*, T. 1821

An vere distincta a *S. Lempiji*?

*Strix noctula*, Reinw. 1821

*Strix strepitans*, T.

*Strix Ceylonensis*, Lath.

# GENERAL CATALOGUE.

## ORDO II. PASSERES.

### FAM. IV. HIRUNDINIDÆ.

Podargus Javensis, *H.*  
 Caprimulgus affinis, *H.*  
 Caprimulgus macrourus, *H.*  
 Hirundo esculenta, *Osborn. It.*  
 Hirundo fuciphaga, *Act. Holm. 33, p. 151.*  
 Hirundo Klecho, *H.*

Podargus cornutus, *T. 182*

Hirundo longipennis, *Reinw. ?*  
 Cypselus longipennis, *T. ?*

### FAM. V. SYLVIADÆ.

Leptopteryx leucorhynchos, *H.*  
 Lanius Bentet, *H.*  
 Edolius forficatus, *H.*  
 Edolius cineraceus, *Le Vaill.*  
 Edolius Malabaricus.  
 Ceblepyris Javensis, *H.*  
 Ceblepyris striga, *H.*  
 Muscicapa flammea, *Gm.*  
 Muscicapa obscura, *H.*  
 Muscicapa Indigo, *H.*  
 Muscicapa Banyumas, *H.*  
 Muscicapa Javanica, *Sparrrm.*  
 Turdus hæmorrhous, *H.*  
 Turdus amoenus, *H. Gracula saularis, Linn.*  
                                   *Turdus mindanensis, Gm.*  
 Turdus macrourus, *Gm.*  
 Turdus analis, *H.*  
 Turdus bimaculatus, *H.*  
 Turdus strigatus, *H.*  
 Turdus viridis, *H.*  
 Turdus chalybeus, *H.*  
 Turdus Javanicus, *H.*  
 Turdus varius, *H.*  
 Turdus cyaneus, *H.*  
  
 Turdus flavirostris, *H.*  
 Turdus ochrocephalus, *Gm.*  
 Turdus gularis, *H.*  
 Turdus dispar, *H.*

Artamus leucorhynchos, *Vieill.*

Edolius longus, *Le Vaill. +*

Edolius retifer, *T. 1823.*

Ceblepyris papuensis, *T. 1823.*

Turdus orientalis, *Lath.*

Muscicapa hirundinacea, *Reinw. 1822.*

Muscicapa cantatrix, *T. 1823.*

Muscicapa Psidii, *Gm.*

To be cancelled.

Lamprotornis cantor, *T. (Gm.)*

Turdus concolor, corrected, *H. —*

Turdus glaucinus, corrected, *H.*

Pitta glaucina, *T. 1823*

MYOPHONUS metallicus, *T. 1823*



# GENERAL CATALOGUE.

TIMALIA pileata, *H.*  
 IORA scapularis, *H.*  
 Oriolus Galbula, *Lath.-var. δ.*  
 Oriolus xanthonotus, *H.*  
 Melliphaga Javensis, *H.*  
 IRENA puella, *H.*  
 Myiothera affinis, *H.*  
 Pastor griseus, *H.*  
 Pastor Jalla, *H.*  
 Pastor tricolor, *H.*  
 Motacilla speciosa, *H.*  
 Motacilla flava, *Linn.*  
 Sylvia Javanica, *H.*  
 Sylvia montana, *H.*  
 Saxicola fruticola, *H.*  
 BRACHYPTERYX montana, *H.*  
 BRACHYPTERYX, (?) sepiaria, *H.*  
 MEGALURUS palustris, *H.*

Oriolus cochinchinensis, *Briss.*  
 To be cancelled.  
 Edolius puellus, *T.*  
 Pitta cyanura, *T. (Bonn.)*  
 Pastor cristatellus, *T. (Linn.)*  
 ENICURUS coronatus, *T. 1821.*  
 Saxicola caprata, corrected, *H.*  
 Malurus marginalis, *Reinw. 1821.*

## FAM. VI. FRINGILLADÆ.

MIRAFRA Javanica, *H.*  
 Parus atriceps, *H.*  
 Fringilla Philippina. Loxia Philippina, *Linn.*  
 Fringilla Manyar, *H.*  
 Fringilla punicea, *H.*  
 Fringilla punctularia. Loxia punctularia, *Linn.*  
 Fringilla striata. Loxia striata, *Linn.*  
 Fringilla prasina, *H.*  
 Fringilla oryzivora. Loxia oryzivora, *Linn.*  
 Fringilla Maja. Loxia Maja, *Linn.*  
 Sitta frontalis, *H.*

Fringilla Amandava, *Linn.*  
 Fringilla sphecura, *T. 1821.*  
 Sitta velata, *T. 1821.*

## FAM. VII. CORVIDÆ.

Colaris orientalis, *Cuv.*  
 Eulabes religiosa, *Cuv.*  
 PHRENOTRIX Temia, *H.*  
 Fregilus Enca, *H.*

CRYPsirina Temmia, *Vieill.*  
 Corvus Enca, corrected, *H.*

## FAM. IX. CETHIADÆ.

POMATORHINUS montanus, *H.*  
 PRINIA familiaris, *H.*

## GENERAL CATALOGUE.

*Orthotomus sepium*, *H.*  
*Cinnyris affinis*, *H.*  
*Cinnyris longirostra*, *H.*  
*Nectarinia Javanica*, *H.*  
*Nectarinia pectoralis*, *H.*  
*Nectarinia eximia*, *H.*

*Nectarinia inornata*, *T.*  
*Nectarinia longirostris*, *T.* 1821  
*Nectarinia lepida*, *T.* (L.)  
*Nectarinia eximia*, *T.*  
*Nectarinia barbata*, *T.*

### FAM. X. MEROPIDÆ.

*Dicaeum cruentatum*, *Cuv.*  
*Dicaeum flavum*, *H.*  
*Eurylaimus Javanicus*, *H.*  
*Merops Javanicus*, *H.*  
*Merops Urica*, *H.*  
*Alcedo Meninting*, *H.*  
*Alcedo Biru*, *H.*  
*Alcedo tridactyla*, *Linn.*  
*Alcedo leucocephala*, *Gm.*  
*Alcedo Coromanda*, *Lath.*  
*Alcedo chlorocephala*, *Gm.*  
*Alcedo sacra*, *Gm.*  
*Alcedo melanoptera*, *H.*  
*Dacelo pulchella*, *H.*

*Eurylaimus Horsfieldii*, *T.*  
*Merops Savigny?* *T.*  
*Merops quadricolor*, *Le Vaill.*

*Alcedo omnicolor*, *T.*

### FAM. XI. BUCERIDÆ.

*Buceros Rhinoceros*, *Linn.*  
*Buceros undulatus*, *Shaw.* *B. plicatus*, *Shaw.*  
*Buceros albirostris*, *Shaw.* *B. Malabaricus*, *Lath.*

## ORDO III. SCANSORES.

### FAM. XII. PICIDÆ.

*Picus Javensis*, *H.*  
*Picus Bengalensis*, *Linn.*  
*Picus miniatus*, *Gm.*  
*Picus puniceus*, *H.*  
*Picus strictus*, *H.*  
*Picus minor*, *Linn.*  
*Picus tristis*, *H.*  
*Picus tiga*, *H.*

*Picus leucogaster*, *T.*  
*Picus dimidiatus*, *T.*

*Picus Goensis*, *Gm.*  
*Picus analis*, *T.*  
*Picus poecilophus*, *T.?*

## GENERAL CATALOGUE.

### FAM. XIII. CUCULIDÆ.

*Phœnicophaus melanognathus*, *H.*  
*Phœnicophaus Javanicus*, *H.*  
*Cuculus orientalis*, *Linn.*  
*Cuculus fugax*, *H.*  
*Cuculus flavus*, *Gm.*  
*Cuculus canorus*, *Linn.*  
*Cuculus Pravata*, *H.*  
*Cuculus lugubris*, *H.*  
*Cuculus xanthorhynchus*, *H.*  
*Cuculus basalis*, *H.*  
*Centropus affinis*, *H.*  
*Centropus Bubutus*, *H.*  
*Centropus lepidus*, *H.*

*Ph. Rouverdin*, *Le Vaill.*  
*Coccyzus chrysogaster*, *T.*

To be cancelled.

*Cuculus chalcites*, *Illig. ?*

*Centropus Philippensis*, *Cuv.*  
 To be cancelled.

### FAM. XIV. BUCCONIDÆ.

*Bucco Javensis*, *H.*  
*Bucco Philippensis*, *Linn.*  
*Bucco australis*, *H.*

*Bucco Kotoreas*, *T.*

*Bucco gularis*, *T.*

### FAM. XV. PSITTACIDÆ.

*Psittacus Osbeckii*, *Lath.*  
*Psittacus Galgulus*, *Linn.*

Var.  $\beta$ , *Le Coulacissi*, *Buff.*

## ORDO IV. GALLINACEÆ.

### FAM. XVI. COLUMBÆ.

*Columba vernans*, *Linn.*  
*Columba litoralis*, *T.*  
*Columba melanocephala*, *Gm.*  
*Columba tigrina*, *T.*  
*Columba risoria*, *Linn.*  
*Columba Bantamensis*, *Sparrm.*  
*Columba bitorquata*, *T.*  
*Columba Javanica*, *T.*  
*Columba Amboinensis*, *Linn.*  
*Columba ænea*, *Linn.*



## GENERAL CATALOGUE.

### FAM. XVII. TETRAONIDÆ.

*Perdix Chinensis*, *Linn.*  
*Perdix Javanica*, *Lath.*  
*Perdix orientalis*, *H.*  
*Ortygis luzoniensis*, *Lath.*

*Perdix personata*, *H. Zool. Res. VIII.*

### FAM. XVIII. PHASIANIDÆ.

*Gallus Javanicus*, *H.*  
*Gallus Bankiva*, *T.*

*Gallus furcatus*, *T.*

### FAM. XIX. PAVONIDÆ.

*Pavo Javanicus*, *H.*

*Pavo muticus*, *Linn.*

## ORDO V. GRALLÆ.

### FAM. XX. CHARADRIADÆ.

*Vanellus melanogaster*, *Bechst.*  
*Vanellus tricolor*, *H.*  
*Charadrius Cantianus*, *Lath.*  
*Charadrius pluvialis*, *Linn.*  
*Charadrius Asiaticus*, *Gm.*  
*Charadrius pusillus*, *H.*  
*Cursorius Isabellinus*, *Meyer?*  
*Glareola orientalis*, *Leach.*

### FAM. XXI. ARDEADÆ.

*Ciconia Javanica*, *H.*  
*Ciconia leucocephala*, *T.*  
*Ardea cinerea*, *Lath.*  
*Ardea purpurea*, *Linn.*  
*Ardea Egretta*, *Linn.*  
*Ardea affinis*, *H.*  
*Ardea Malaccensis*, *Gm.*  
*Ardea speciosa*, *H.*  
*Ardea nycticorax*, *Linn.*  
*Ardea sinensis*, *Gm.*

*Ciconia capillata*, *T.*

*Ardea russata*, *T.*

Name to be cancelled, as not distinct from *A. speciosa*.

Name to be cancelled, as not distinct from *A. lepidæ*.

## GENERAL CATALOGUE.

Ardea flavicollis, *Lath?*  
 Ardea lepida, *H.*  
 Ardea nebulosa, *H.*  
 Ardea Javanica, *H.*  
 Ardea cinnamomea, *Gm.*

An vere distincta ab *A. lepida?*  
*Ardea virescens, Linn.*

### FAM. XXII. TRINGIDÆ.

Numenius Phæopus, *Lath.*  
 Scolopax saturata, *H.*  
 Scolopax Gallinago, *Linn.*  
 Totanus affinis, *H.*  
 Totanus hypoleucos, *T.*  
 Totanus acuminatus, *H.*  
 Totanus tenuirostris, *H.*  
 Totanus Damacensis, *H.*  
 Totanus Glottis, *Bechst.*  
 Totanus Javanicus, *H.*  
 Rynchæa orientalis, *H.*  
 Limosa melanura, *Leisl.*  
 Tringa subarquata, *T.*  
 Himantopus melanopterus, *Meyer.*

*Scolopax Terek, Lath.* *Limosa Terek, T.*  
*R. varia, T.*

### FAM. XXIII. RALLIDÆ.

Parra superciliosa, *H.*  
 Porphyrio Indicus, *H.*  
 Gallinula gularis, *H.*  
 Gallinula lugubris, *H.*  
 Gallinula orientalis, *H.*  
 Gallinula Javanica, *H.*  
 Rallus gularis, *H.*  
 Rallus fuscus, *Linn.*  
 Rallus quadristrigatus, *H.*  
 Fulica atra, *Linn.*

*P. smaragdinus, T.*  
 Name to be cancelled, as not distinct from the following.

*Gallinula phoenicurus, Penn. Ind. Zool.*

*Gallinula superciliosa, T.*

## ORDO VI. PALMIPEDES.

### FAM. XXIV. PELECANIDÆ.

Pelecanus Philippensis, *Gm.*  
 Pelecanus Javanicus, *H.*

Name to be cancelled, as not specifically distinct from the former

GENERAL CATALOGUE.

Carbo Javanicus, *H.*

Plotus melanogaster, *Gm.*

|| Carbo Africanus, *Lath.*

FAM. XXV. COLYMBIDÆ.

Podiceps minor, *Lath.*

||

FAM. XXVI. LARIDÆ.

Sterna minuta, *Linn.*

Sterna Javanica, *H.*

Sterna media, *H.*

Sterna grisea, *H.*

Sterna affinis, *H.*

||

Sterna melanogaster, *T.* +

FAM. XXVII. ANATIDÆ.

Anas Javanica, *H.*

|| Anas arcuata, *Cuv.* 7



The following order is proposed for the arrangement of the Subjects and Plates in the binding of the Volume. To facilitate the reference to the Plates of Illustration, the order in which the Subjects were given in the successive Numbers, is added. The Plates of Illustration should be bound, in the order of publication, at the end of the Volume.



#### MAMMALIA.

*Simia syndactyla.*  
*Semnopithecus Maurus.*  
*Semnopithecus Pyrrhus.*  
*Tarsius Bancanus.*  
*Cheiromeles torquatus.*  
*Nyctinomus tenuis.*  
*Rhinolophus larvatus.*  
*Rhinolophus nobilis.*  
*Vespertilio Temminckii.*  
*Pteropus Javanicus.*  
*Pteropus rostratus.*  
*Tupaia Javanica.*  
*Tupaia tana.*  
*Ursus Malayanus.*  
*Gulo orientalis.*  
*Mydaus meliceps.*  
*Viverra Musanga.*  
*Viverra Rasse.*  
*Mangusta Javanica.*  
*Lutra leptonyx.*  
*Felis Javanensis.*  
*Felis Sumatrana.*  
*Felis gracilis.*  
*Mus setifer.*  
*Sciurus insignis.*  
*Sciurus Plantani.*  
*Sciurus bicolor.*  
*Pteromys genibarbis.*  
*Pteromys lepidus.*  
*Rhinoceros sondaicus.*  
*Tapirus Malayanus.*  
*Cervus Muntjak.*

#### BIRDS.

*Falco Ichthyætus.*  
*Falco cærulescens.*  
*Falco Limnæetus.*  
*Strix badia.*  
*Podargus Javanensis.*  
*Muscicapa Banyumas.*  
*Muscicapa hirundinacea.*  
*Muscicapa Indigo.*  
*Turdus varius.*  
*Turdus cyaneus.*  
*Timalia pileata.*  
*Timalia gularis.*  
*Iōra scapularis.*  
*Oriolus xanthonotus.*  
*Irena puella.*  
*Motacilla speciosa.*  
*Brachypterix montana.*  
*Phrenotrix Temia.*  
*Pomatorhinus montanus.*  
*Prinia familiaris.*  
*Calyptomena viridis.*  
*Eurylaimus Javanicus.*  
*Alcedo Biru.*  
*Dacelo pulchella.*  
*Phœnicophaus Javanicus.*  
*Cuculus lugubris.*  
*Cuculus xanthorhyncus.*  
*Centropus Philippensis.*  
*Perdix personata.*  
*Ardea speciosa.*  
*Scolopax saturata.*  
*Parra superciliosa.*  
*Anas arcuata.*

# ZOOLOGICAL RESEARCHES, &c.

## MAMMALIA.

- No. I.*—*Felis Javanensis.*  
*Felis gracilis.*  
*Viverra Musanga.*  
*Tapirus Malayanus.*
- No. II.*—*Mydaus meliceps.*  
*Gulo orientalis.*  
*Tarsius Bancanus.*  
*Felis Sumatrana.*
- No. III.*—*Tupaia Javanica.*  
*Tupaia tana.*  
*Simia syndactyla.*  
*Pteropus rostratus.*
- No. IV.*—*Semnopithecus Maurus.*  
*Ursus Malayanus.*  
*Pteromys genibarbis.*  
*Pteropus Javanicus.*
- No. V.*—*Nyctinomus tenuis.*  
*Mangusta Javanica.*  
*Sciurus insignis.*  
*Pteromys lepidus.*
- No. VI.*—*Cervus Muntjak.*  
*Viverra Rasse.*  
*Rhinolophus larvatus.*  
*Rhinoceros sondaicus.*
- No. VII.*—*Sciurus Plantani.*  
*Lutra leptonyx.*  
*Semnopithecus Pyrrhus.*  
*Rhinolophus nobilis.*
- No. VIII.*—*Sciurus bicolor.*  
*Mus setifer.*  
*Vespertilio Temminckii.*  
*Cheiromeles torquatus.*

## BIRDS.

- Irena puella, male.*  
*Irena puella, female.*  
*Phrenotrix Temia.*  
*Motacilla speciosa.*
- Eurylaimus Javanicus.*  
*Podargus Javanensis.*  
*Turdus varius.*  
*Daëlo pulchella.*
- Falco Ichthyætus.*  
*Falco cærulescens.*  
*Timalia pileata. Timalia gularis.*  
*Cuculus xanthorhynchus.*
- Calyptomena viridis.*  
*Strix badia.*  
*Alcedo Biru.*  
*Turdus cyaneus.*
- Pomatorhinus montanus.*  
*Phœnicophaus Javanicus.*  
*Scolopax saturata.*  
*Muscicapa Indigo.*
- Iōra scapularis.*  
*Falco Limnæetus.*  
*Oriolus xanthonotus.*  
*Centropus Philippensis.*
- Brachypterix montana.*  
*Ardea speciosa.*  
*Muscicapa Banyumas. M. hirundinæa.*  
*Cuculus lugubris.*
- Prinia familiaris.*  
*Perdix personata.*  
*Parra superciliosa.*  
*Anas arcuata.*

## ERRATA.

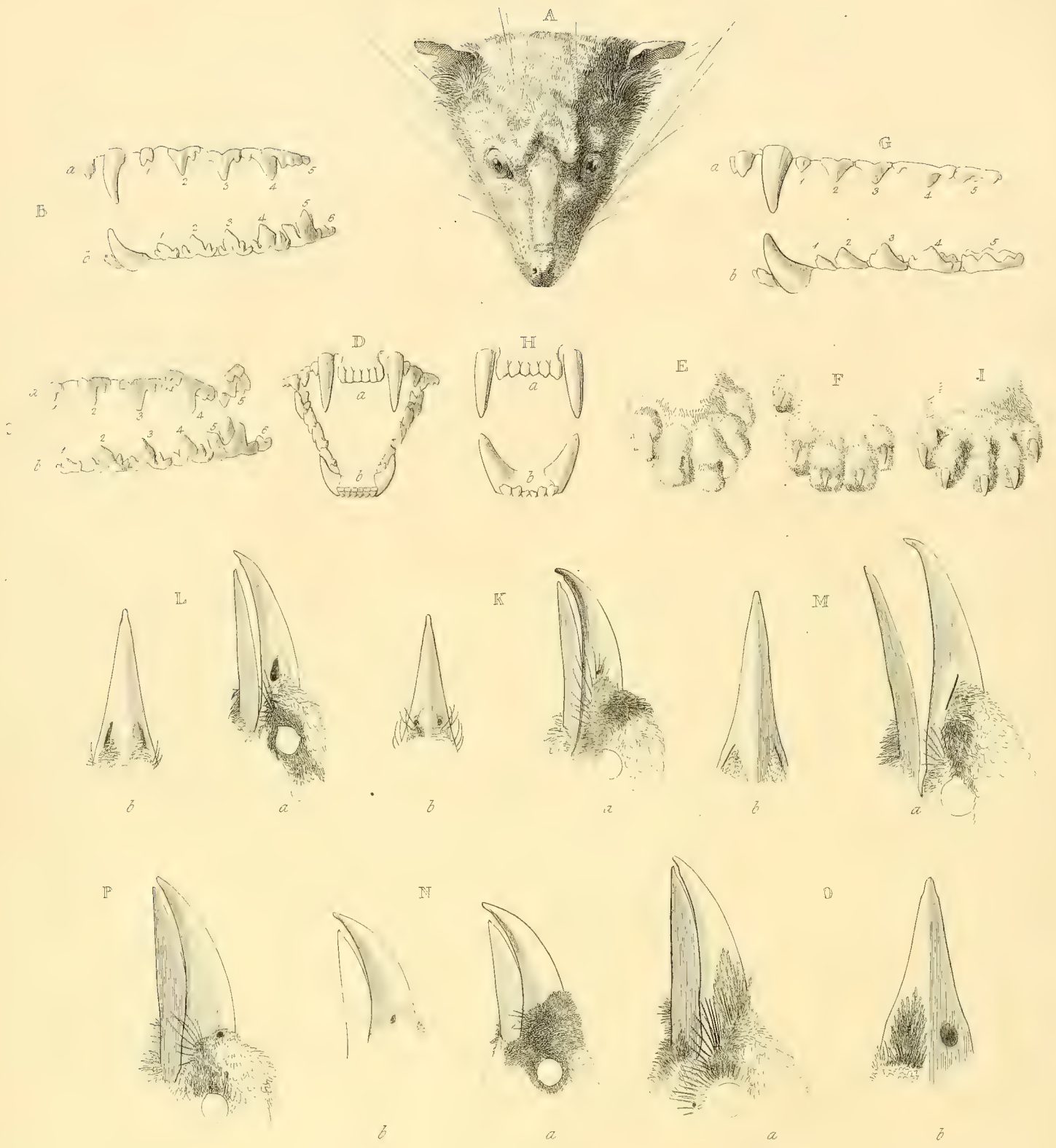
Article IRENA PUELLA, second page, four lines from the bottom, for *Cornirostres* read *Dentirostres*.

Article PTEROMYS GENIBARBIS, first page, sixth line, for *PETAURUS* read *PETAURISTUS*.

Dates of publication of parts, after Sherborn,  
Index Animalium 1801-1850, pt. 1, p. lxix:

1. July 1821
2. Nov. 1821
3. Feb. 1822
4. June 1822
5. Oct. 1822
6. Apr. 1823
7. Oct. 1823
8. Apr. 1824





Engraved by W. Taylor.

## Explanation of the Plate of Illustrations

TO THE FIRST NUMBER OF

## ZOOLOGICAL RESEARCHES IN JAVA, &c.

---

- A.* Head of *Felis gracilis*: two-thirds of the natural size.
- B.* Lateral view of the teeth as they appear exteriorly; (*a*) upper, (*b*) lower jaw.  
In this and the following figures, *C. D. E. & F.*, the objects are represented about one-fourth larger than the natural size.
- C.* Lateral view of the teeth as they appear interiorly; (*a*) upper, (*b*) lower jaw.
- D.* Front view of the teeth; (*a*) upper, (*b*) lower jaw.
- E.* Fore foot; to shew the toes covered with fur, concealing the claws.
- F.* Hind foot; shewing *five* toes, and the fur removed, to illustrate the size, insertion, and disposition of the claws.
- G.* Lateral view of the teeth of *Viverra Musanga*, of natural size; (*a*) upper, (*b*) lower jaw.
- H.* Front view of the teeth of *Viverra Musanga*.
- I.* Hind foot of *Viverra Musanga*. This is given to afford a comparison with the foot of *Felis gracilis*: Fig. *I.* shews the naked claws of the former, as they naturally appear: Fig. *E.* the hairy covering of the latter. (See the generic description.)
- K.* Bill of *Irena puella*; (*a*) profile, (*b*) seen from above.
- L.* Bill of *Oriolus galbula*; (*a*) profile, (*b*) seen from above.
- M.* Bill of *Coracias garrula*; (*a*) profile, (*b*) seen from above.
- N.* Bill of *Phrenotrix Temia*; (*a*) profile, (*b*) the same, to shew the transverse groove at the base of the bill, containing the nostrils.
- O.* Bill of *Corvus Pica*; (*a*) profile, (*b*) seen from above; the stiff decumbent vibrissæ covering the nostrils, are removed on one side, to shew their form and disposition.
- P.* Profile of the bill of *Corvus senegalensis*.









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## Explanation of the Plate of Illustrations

TO THE SECOND NUMBER OF

## ZOOLOGICAL RESEARCHES IN JAVA, &c.

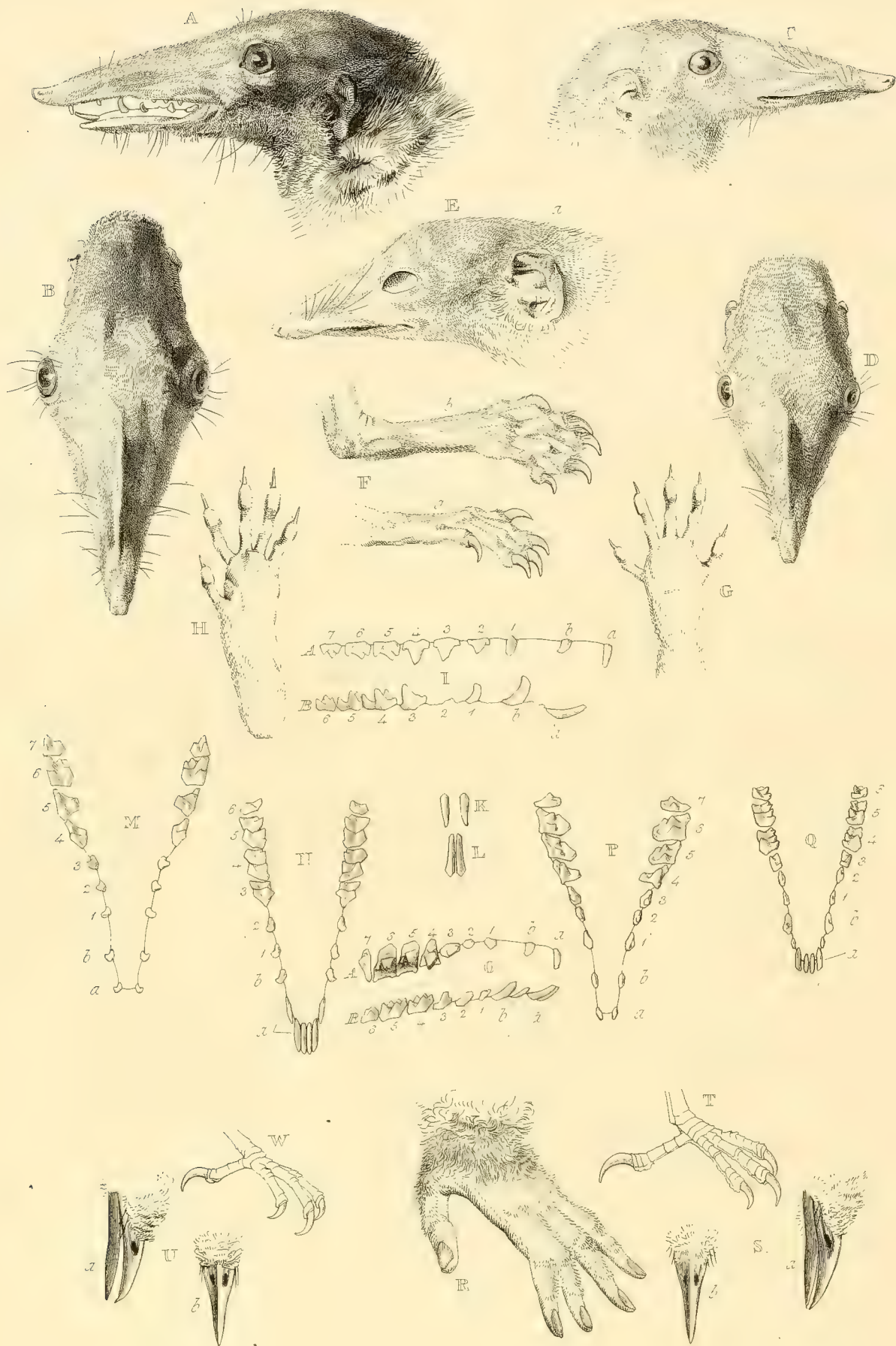
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- A.* Profile of the head of *Mydaus Meliceps*, drawn from a young subject preserved in spirit of wine: in order to shew the structure of the ear, the long hairs which conceal the organ, are turned down.
- B.* Profile of the head of *Mephitis Dimidiata*, *Fischeri*, the CHINCHE of Buffon; from a specimen sent from North America by Mr. Franklin.
- C.* Skull of the *Mydaus Meliceps*, belonging to a very perfect skeleton, prepared at the Royal College of Surgeons, from a subject sent from Sumatra by Sir. Stamford Raffles. Of this in Letter
- D.* The upper-jaw is separately represented, to afford a distinct view of the teeth, *f*. 1, 2, False grinders; 3, Carnivorous; 4, Tuberculous tooth.
- E.* Lower-jaw of the same; *f*. 1, 2, 3 False grinders; 4, Carnivorous; 5, Tuberculous tooth.
- F.* Front view of the teeth of *Mephitis Dimidiata*; (*a*) upper, (*b*) lower-jaw.
- G.* Front view of the teeth of *Tarsius Bancanus*; (*a*) upper, (*b*) lower-jaw. In each jaw, *f*. 1, front tooth; 2, canine tooth; 3, 4, 5, first grinders with single points; 6 and 7, large grinders.
- H.* Rectum and anal-glands of the *Mydaus Meliceps*, drawn from a preparation preserved in spirit of wine: (*a*) muscular ring by which the duct leading from the gland to the rectum is closed; (*b*) one of the glands laid open, to exhibit the internal surface.
- I.* Exhibits the relative situation of the rectum and anal-glands in a young subject of *Mydaus Meliceps* preserved in spirit of wine: (*a*) the rectum laid open; (*c*) its external termination; (*b*) on each side, the orifice of the duct by which the fetid matter is conveyed from the gland to the rectum.
- K.* Anterior view of a preparation from the Museum of the Royal College of Surgeons, representing the rectum laid open, and in (*a*) the orifice of the duct conveying the fetid matter from the anal-gland, in (*b*) the internal surface of that gland, and in (*c*) the termination of the rectum.
- L.* Posterior view of the same preparation, exhibiting the relative situation of the anal-glands and the rectum in one of the species of *Mephitis*.
- M.* Sole of the left fore foot of *Mydaus Meliceps*, shewing the relative disposition of the toes, and the length of the claws.
- N.* One of the claws of *Mydaus Meliceps* separately.
- O.* One of the claws of *Mephitis Dimidiata*.
- P.* Bill of *Eurylaimus Javanicus*; (*a*) profile, (*b*) seen from above.
- Q.* Anterior toes of the same, to shew their relative connection.
- R.* Bill of *Podargus Javanensis*; (*a*) profile, (*b*) seen from above.
- S.* Anterior toes of the same.









Engraved by W. Taylor.



## Explanation of the Plate of Illustrations

TO THE THIRD NUMBER OF

## ZOOLOGICAL RESEARCHES IN JAVA, &c.

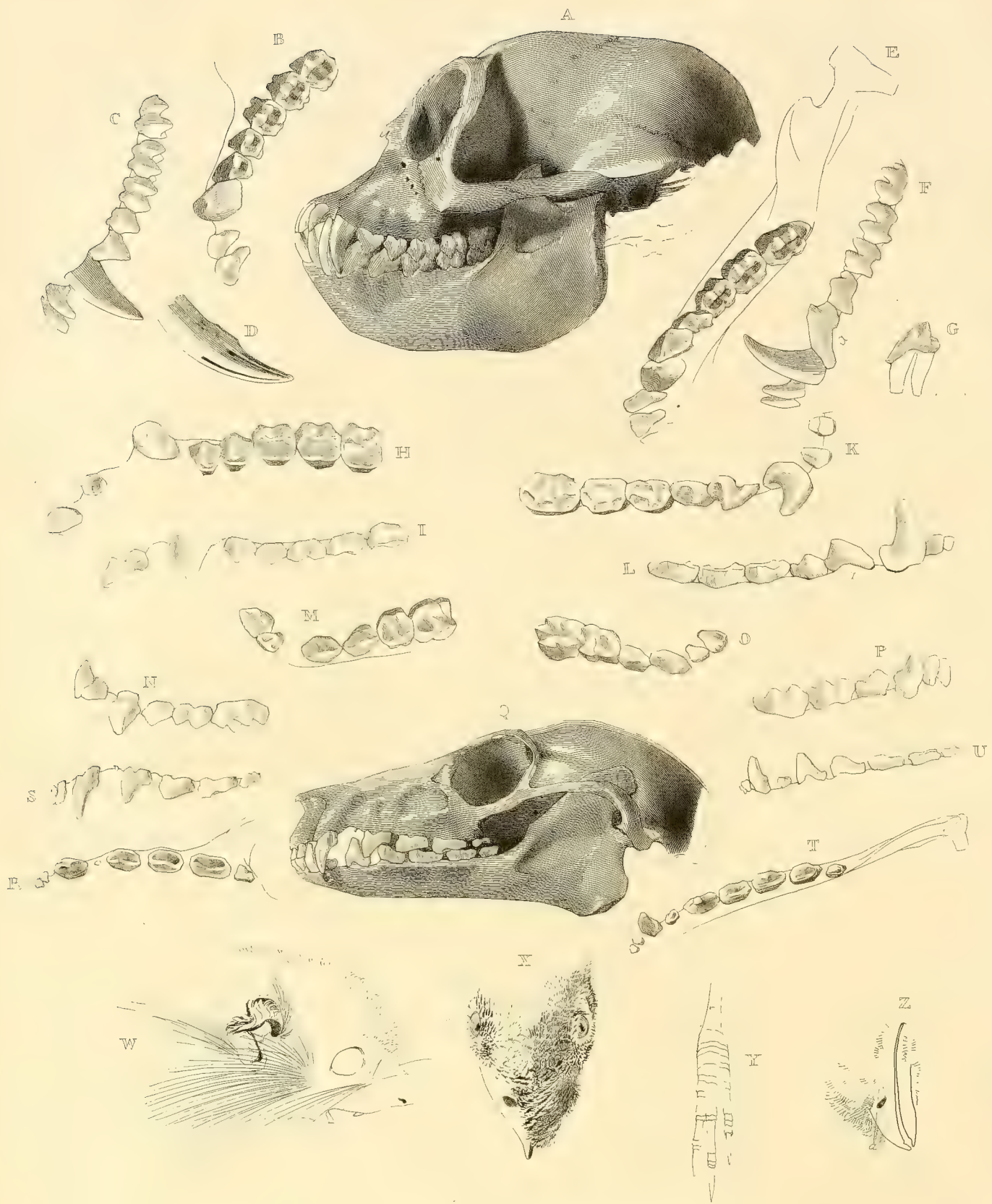
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- A.* Profile of the head of the *Tupaia tana*: of natural size.
- B.* The same, seen from above.
- C.* Profile of the head of the *Tupaia ferruginea*: of natural size.
- D.* The same, seen from above.
- E.* Profile of the head of the *Tupaia javanica*, somewhat enlarged, to exhibit distinctly in (*a*) the structure of the external ear.
- F.* Feet of the *Tupaia tana*; (*a*) the fore, (*b*) the hind foot.
- G.* Fore foot of the *Tupaia javanica*.
- H.* Hind foot of the same.
- I.* Lateral view of the teeth of the *Tupaia tana*: *A.* upper jaw; (*a*) front, (*b*) canine tooth; 1, 2, 3, 4, 5, 6, 7, grinders: *B.* lower jaw; (*a*) intermediate front tooth, with the rudiments of the two lateral ones; (*b*) canine tooth; 1, 2, 3, 4, 5, 6, grinders.
- K.* Represents the distance and relative situation of the two front teeth of the *Tupaia tana* in the upper jaw.
- L.* The intermediate front teeth of the *Tupaia tana* in the lower jaw.
- M.* Teeth of the *Tupaia ferruginea* in their natural situation, in the upper jaw, seen from above; (*a*) front; (*b*) canine tooth; 1, 2, 3, 4, 5, 6, 7, grinders.
- N.* Teeth of the *Tupaia ferruginea* in their natural situation, in the lower jaw, seen from above; (*a*) front teeth; (*b*) canine tooth; 1, 2, 3, 4, 5, 6, grinders.
- O.* View of the teeth of the *Tupaia javanica*: *A.* representing them in the upper jaw in profile, seen from within; (*a*) front, (*b*) canine tooth; 1, 2, 3, 4, 5, 6, 7, grinders: *B.* representing them in the lower jaw in profile, seen from without; (*a*) front teeth, (*b*) canine tooth; 1, 2, 3, 4, 5, 6, grinders.
- P.* Teeth of the *Tupaia javanica*, in their natural situation, in the upper jaw, seen from above; (*a*) front, (*b*) canine tooth; 1, 2, 3, 4, 5, 6, 7, grinders.
- Q.* Teeth of the *Tupaia javanica*, in their natural situation, in the lower jaw, seen from above; (*a*) front teeth, (*b*) canine tooth; 1, 2, 3, 4, 5, 6, grinders.
- R.* Hand of the posterior extremities of the *Simia syndactyla*.
- S.* Bill of the *Timalia pileata*; (*a*) profile, (*b*) seen from above.
- T.* Foot of the same.
- U.* Bill of the *Timalia gularis*; (*a*) profile, (*b*) seen from above.
- W.* Foot of the same.









Engraved by W. Taylor.

## Explanation of the Plate of Illustrations

TO THE FOURTH NUMBER OF

## ZOOLOGICAL RESEARCHES IN JAVA, &c.

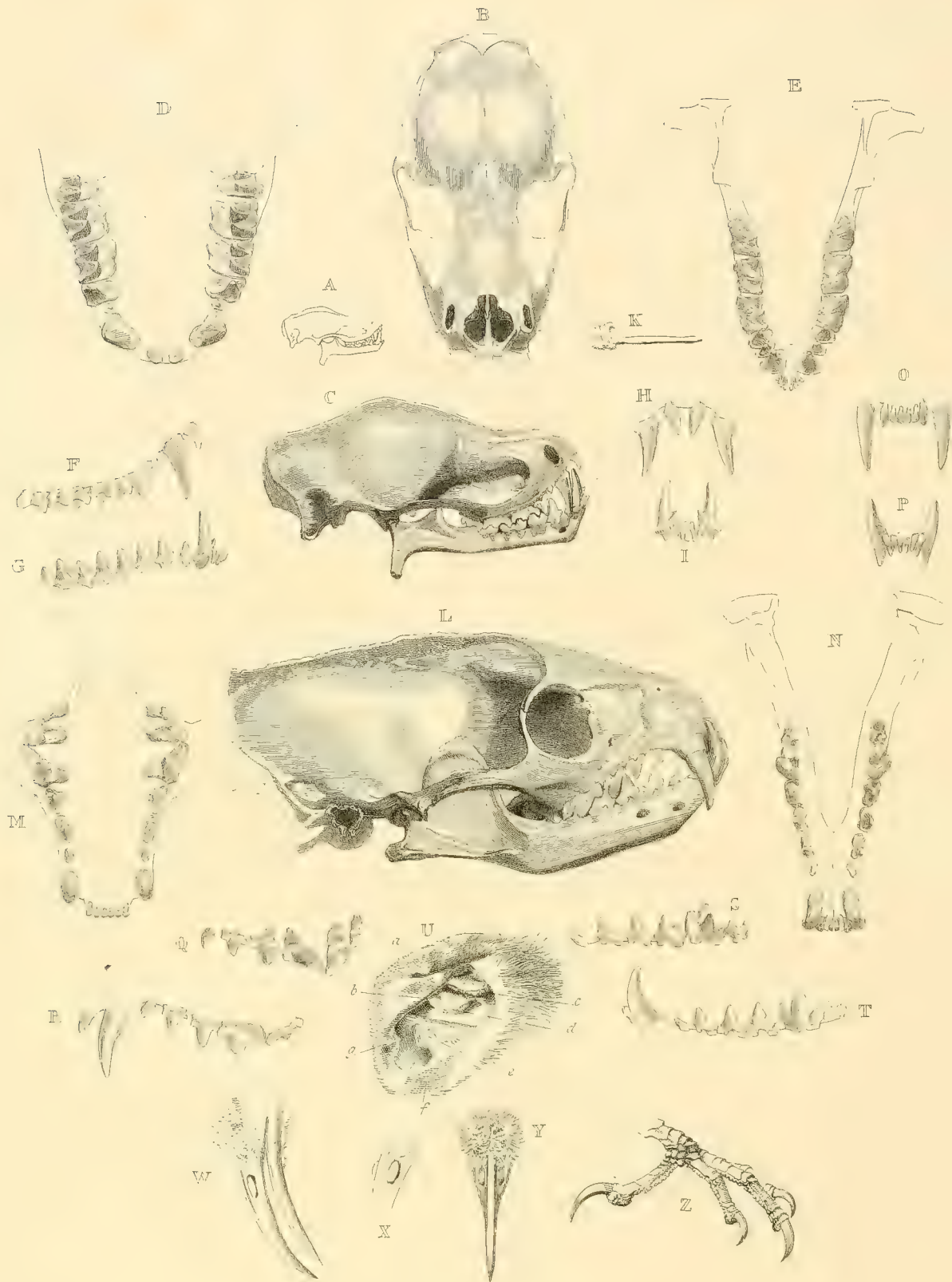
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- A.* Skull of the *Semnopithecus Maurus*, the natural size reduced one-third; the posterior portion having been removed in the preparation of the subject to which the skull belonged, the contour is indicated by a dotted line, from a skull contained in the Museum of the Royal College of Surgeons.
- B.* Teeth in the upper jaw of the same, of natural size, seen from above.
- C.* Profile of the same.
- D.* Canine tooth in the upper jaw of the same, with the entire roots; shewing the interior surfaces, and the grooves with which they are marked.
- E.* Teeth in the lower jaw of the same, seen from above: a principal object of this view is to represent distinctly the *five* points of the posterior grinder, by which character the genus *Semnopithecus* is distinguished from *Cercopithecus*.
- F.* Profile of the same, exhibiting an exterior view of the relative situation of the canine tooth, and of the first grinder (*a*).
- G.* First grinder of the same, with its roots entire, shewing its interior surfaces.
- H.* Teeth of the *Simia syndactyla*, or Siamang, in the upper jaw, of natural size, seen from above, from a skull contained in the Museum of the Royal College of Surgeons.
- I.* Profile of the same.
- K.* Teeth in the lower jaw of the same, seen from above.
- L.* Profile of the same, exhibiting (*a*) the first grinder.
- M.* Teeth in the upper jaw of a young subject of *Simia syndactyla*, of natural size, seen from above: from the Museum of Joshua Brookes, Esq.
- N.* Profile of the same.
- O.* Teeth in the lower jaw, from the same, seen from above.
- P.* Profile of the same.
- Q.* Skull of the *Pteropus javanicus*, of natural size.
- R.* Teeth of the same, in the upper jaw, seen from above.
- S.* Profile of the same.
- T.* Teeth of the same, in the lower jaw, seen from above.
- U.* Profile of the same.
- W.* Profile of the head of the *Pteromys genibarbis*, somewhat enlarged, to shew the bristles disposed on the upper lip, on the cheeks, and on the lobes of the ears.
- X.* Bill of *Calyptomena viridis*, seen from above.
- Y.* Foot of the same.
- Z.* Profile of the bill of the same; in (*a*) the aperture and direction of the tubular nares.









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## Explanation of the Plate of Illustrations

TO THE FIFTH NUMBER OF

## ZOOLOGICAL RESEARCHES IN JAVA, &c.

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- A.* Skull of the *Nyctinomus tenuis*, of natural size.
- B.* Skull of the same seen from above, magnified in the proportion of three to one.
- C.* Profile of the same, magnified in the same proportion.
- D.* Upper jaw of the same, separately represented, to afford a distinct view of the details of the teeth, corresponding to the description, magnified in the proportion of more than four to one; which proportion has also been preserved in the following Figures, *E. F. G. H.* and *I.*
- E.* Lower jaw of the same.
- F.* Profile of the teeth in the upper jaw of the same.
- G.* Profile of the same in the lower jaw.
- H.* Front view of the Incisors and Canine teeth in the upper jaw of the same.
- I.* Front view of the Incisors and Canine teeth in the lower jaw of the same.
- K.* Tongue and superior extremity of the trachea-arteria of the same, of natural size.
- L.* Skull of the *Mangusta javanica*, of natural size. (This skull was taken from the largest specimen in the Museum at the India House; as the posterior extremity had been removed, the contour is added in a dotted line, from the Egyptian *Mangusta*, in the Collection of Joshua Brookes, Esq.)
- M.* Upper jaw and teeth of the same.
- N.* Lower jaw and teeth of the same.
- O.* Front and Canine teeth of the same in the upper jaw.
- P.* Front and Canine teeth of the same in the lower jaw.
- Q.* Grinders in the upper jaw of the same, in profile, as they appear interiorly.
- R.* Exterior Front teeth, Canine tooth, and grinders of the same, in profile, as they appear exteriorly.
- S.* Grinders in the lower jaw of the same, in profile, as they appear interiorly.
- T.* Exterior Front tooth, Canine tooth, and grinders of the same, in profile, as they appear exteriorly.
- U.* Ear of the same, with the details illustrative of the description; (*a*) Helix; (*b*) Antihelix; (*c*) and (*d*) Membranes passing transversely across the ear to the Antihelix; (*e*) Concha; (*f*) and (*g*) Tragus and Antitragus, indicated very obscurely.
- W.* Bill of *Pomatorhinus montanus*, in profile.
- X.* A small portion of the same, to exhibit the corneous covering of the nares.
- Y.* Bill of the same, seen from above.
- Z.* Foot of the same.









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## Explanation of the Plate of Illustrations

TO THE SIXTH NUMBER OF

## ZOOLOGICAL RESEARCHES IN JAVA, &c.

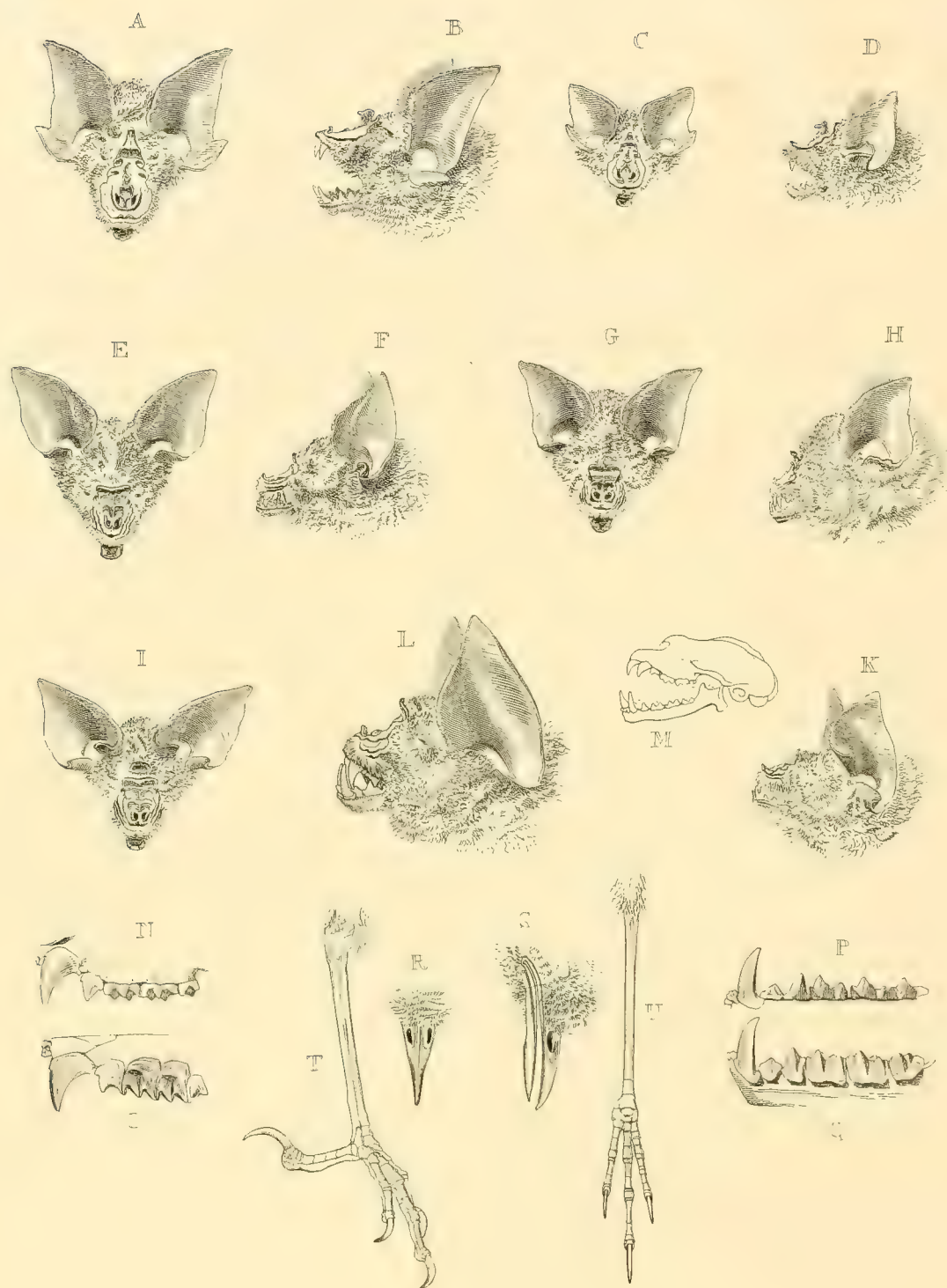


- A.* Profile of the skull of the *Cervus Muntjak*, one-third of the natural size.
- B.* Head of the *Cervus Muntjak* seen from above, one-third of the natural size.
- C.* Upper jaw of the *Rhinolophus vulgaris*, affording a distinct view of the details of the teeth, magnified in the proportion of four to one; which proportion has also been preserved in the Figures *D. E. F.* and *G.*
- D.* Lower jaw of the same.
- E.* Intermaxillary bone and front teeth of the same.
- F.* Front and canine teeth of the same in the upper jaw.
- G.* Front and canine teeth of the same in the lower jaw.
- H.* Bill of *Iöra scapularis*, in profile.
- I.* Bill of the same, seen from above.
- K.* Foot of the same.









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## Explanation of the Plate of Illustrations

TO THE SEVENTH NUMBER OF

## ZOOLOGICAL RESEARCHES IN JAVA, &c.



- A* and *B*. Head of the *Rhinolophus affinis*.  
*C* and *D*. Head of the *Rhinolophus minor*.  
*E* and *F*. Head of the *Rhinolophus vulgaris*.  
*G* and *H*. Head of the *Rhinolophus deformis*.  
*I* and *K*. Head of the *Rhinolophus insignis*.  
*L*..... Head of the *Rhinolophus nobilis*.  
*M*..... Contour of the Skull of the *Rhinolophus unifer*.  
*N*..... Teeth of the *Rhinolophus nobilis*, in profile, in the upper jaw, as they appear exteriorly, magnified in the proportion of two to one; which proportion has also been preserved in the Figures *O*. *P*. and *Q*.  
*O*..... Interior view of the same.  
*P*..... Teeth of the *Rhinolophus nobilis*, in profile, in the lower jaw, as they appear interiorly.  
*Q*..... Exterior view of the same.  
*R*..... Bill of the *Brachypteryx montana*, seen from above.  
*S*..... .. Bill of the same in profile.  
*T*..... Lateral view of the tarsus and foot of the same.  
*U*..... Front view of the same.

























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